IL 16, 1951

STEEL

The Weekly Magazine of Metalworking

Tank-Automotive Outlay Tops $3 Billion

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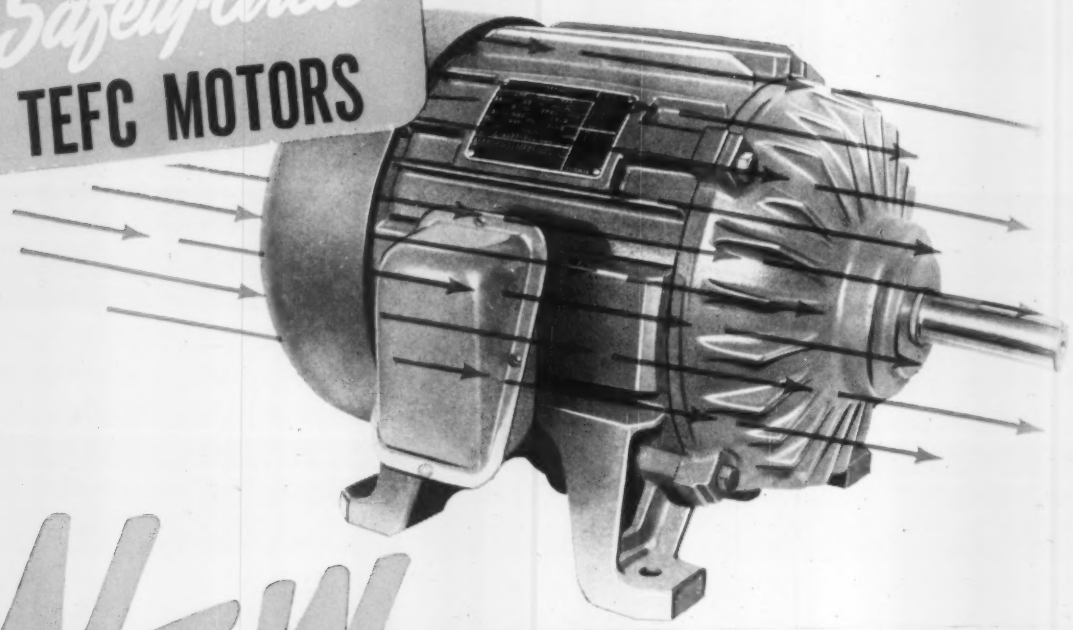
ALLIS-CHALMERS

"Safety-Circle"

TEFC MOTORS



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ALLIS-CHALMERS

STEEL
The Weekly Magazine of Metalworking

VOL. 128 NO. 16 APRIL 16, 1951

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***Next Week*... Materials Handling Show and Conference Issue... What's the Fare on Your Materials Handling System... Electric Fusion Submerged-Arc Process Welds Expanded Steel Transmission Pipe... Steel Expansion—How Much and Where**

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $18. Single copies (current issues) 35 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879. Copyright 1951 by Penton Publishing Co.

Luster-on KHAKI DRAB ZINC DIP BETTER THAN BEST HOPES

Announced a few weeks ago as an olive drab finish for zinc plate by the makers of Luster-on Bright Dips, Chemical Corporation's latest conversion coating is exceeding highest expectations. The first batches in the field indicate even better color and film stability.

Referred to as olive drab or light khaki, Company has settled on official name of "Luster-on KHAKI DRAB". When diluted one part of KHAKI DRAB to seven parts water, the work comes out a light iridescent tan; diluted one to ten, color is rich bronze brown.

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Now Released to General Industry

When first announced the new khaki finish was restricted to Government orders. Now Chemical Corporation officials have given nod to full release to include civilian goods (DO's are given preference). Reason given is that new KHAKI DRAB is economical in use of critical materials. Replacing cadmium and nickel with zinc is first economy. This part is now largely required by NPA orders. Second economy is that KHAKI DRAB uses less ingredients in short supply per square foot of work tested than companion Luster-on Bright Dips, Utility-15 and Utility-25.

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Where brilliance is desired to replace chromium, nickel or cadmium, Luster-on Utility -15 or -25 is producing amazing results over ordinary zinc plate at costs of a fifth of a cent per square foot. Unequalled by any other product, Luster-on Utility is the choice of American Industry. No wartime substitute, it is the choice of engineers who consider cost, ease of application and control, appearance and protective value.

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Sample parts sent to laboratory will be processed with either Luster-on KHAKI DRAB or Utility Bright Dip and returned without obligation. Technical advice for conversions to Luster-on is available. Address inquiries to The Chemical Corporation, 59 Waltham Avenue, Springfield 9, Mass.

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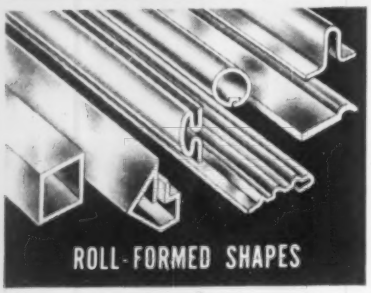

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Behind the Scenes...

Request

Last year, in addition to the thousands of reprints that we gave away, we sold more than 250,000 editorial reprints of various articles appearing in STEEL. Those covered 467 pages of editorial material—or more than twice as much as found in an ordinary-size book.

Requests for reprints do not come from the U. S. alone. From 23 different countries came requests for reprints of the "Fundamentals of Steelmaking" series, now available as a hard-cover book.

Fay Curtis and Alice Dailey handle inquiries for just a few reprints. Mrs. Carrie Niles takes care of bulk reprint jobs.

Fay and Alice are the ones who receive your mail when it's addressed to Reader's Service Department, STEEL, Penton Bldg., Cleveland 13, O. They frequently get requests, usually from students, that read: "Send me everything you have ever published about steel." One individual wanted to come in and look at every issue we have published since inception, in 1882.

If He Had Only Known

Gimlet-eyed Associate Editor Ed Karpick was on a postman's holiday a few Sundays ago and read a short story in *This Week*, the syndicated magazine section in many Sunday newspapers. He ran across a short story, "Hijacker's Paradise," by Robert M. Yoder that appeared in the Apr. 1 issue.

On page 13 the villain, Mr. Derringen, is in the midst of an interview with the sheriff and Mr. Yoder writes: "But now Mr. Derringen, too, was looking shrewd, a little as if a naive supplier had offered him copper for the price of tin."

Such a supplier would not have been naive, for tin is almost six times as expensive as copper, as Mr. Yoder would have discovered after a brief consultation with STEEL's weekly nonferrous price figures that in this issue appear on page 133.

Non-Mixers

On page 73 of the April issue of *The Boilermakers Journal*, a publication for an A.F.L. affiliate, appears an article labeling General Motors' 1950 profits as "shocking" and tending to drive "people into Socialism or even Communism." On page 81 of the same issue is an item that points out that in the U. S., a worker labors 8 hours to earn $10, 19 hours in Britain and 81 hours in Russia to earn the same amount. The boilermakers apparently want the no-profits feature of Communism with the high-wages feature of Capitalism. How are you going to point out to them that the two don't mix?

Seen and Heard

A Kaiser-Frazer show window in Cleveland had these screaming words plastered from one edge to the other: The Henry J—85 cents a Pound.

In the Milwaukee railroad terminal, the train announcer doesn't say a train is cancelled or will not run. Trains up there are "annulled."

Puzzle Corner

The small plot in the Apr. 2 problem had an area of 2.31 square feet. First in with correct answers were Borge Rosing of West Virginia Steel, J. J. Wilder of Rochester Products Division of GM, E. R. Hornbake of Pittsburgh Tube Co., R. R. Tyrna of Great Lakes Steel Corp., C. E. Hoekstra of Magnavox Co., D. M. Hoak of Henry Weis Mfg. Co. and M. F. Coon of Sharon Steel Corp.

A. W. Everest of General Electric Co. submits this one: It is 150 miles from Albany to New York. A train leaves New York at 4 p.m. going 50 miles per hour. Another leaves Albany at 6 p.m. going 75 miles per hour. Which is the furthest from New York when they meet?

15.7 Cents a Word

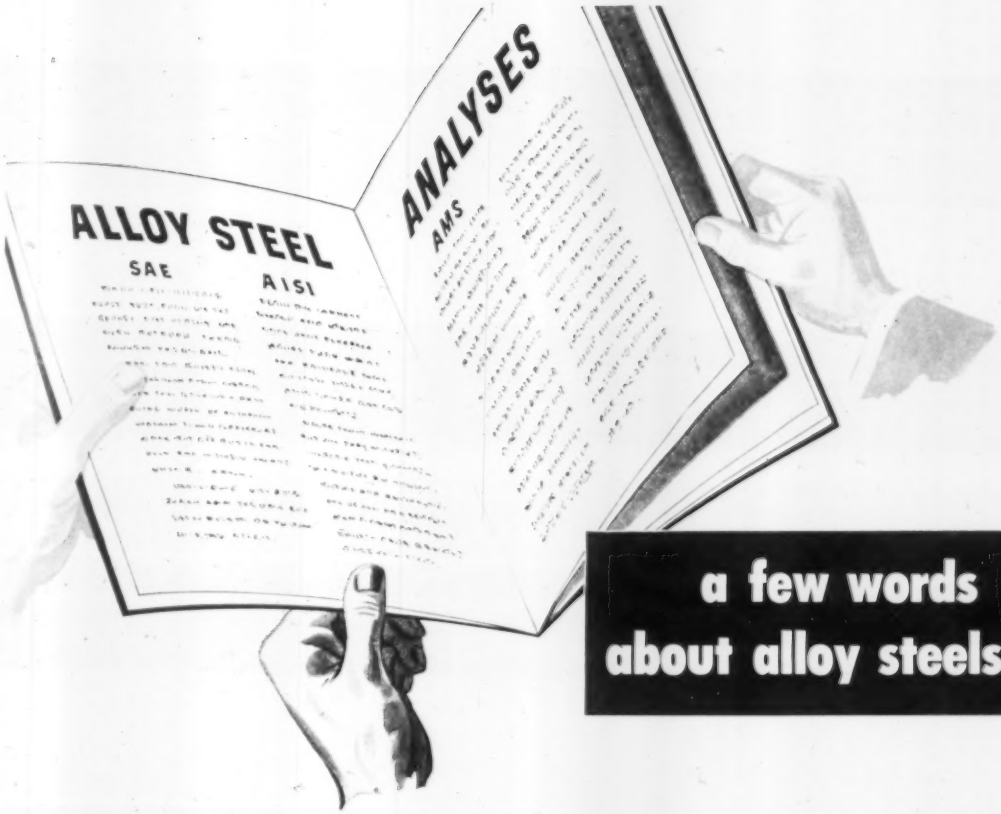
One, two, three, four, five, six, seven, eight, nine, ten. We just cost the boss $1.57. For the editorial cost per word in STEEL is 15.7 cents. That doesn't include printing and distribution expenses, just the price of hiring the editors, buying their equipment, paying their communications bills so that you get the latest metalworking news every Monday morning.

An average issue of STEEL carries 59,600 editorial words. That means 4 million editorial words a year are printed in these pages. A 125,000-word book of nonfiction may sell for $3. Steel in a year brings you 32 such books—but for only $10 and even less if you buy a subscription biannually. Thirty-two nonfiction books would cost you $96.

Now, if . . . whoops, hold everything, enough said, cease the wordage, stop.

Shrdlu

(Metalworking Outlook—page 35)



a few words about alloy steels...

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LETTERS
TO THE EDITORS

Dry Cell Possibilities

Engineer Research & Development Laboratories are making a study of electrical power sources for possible military use. Where can we get more details on the development of reverse dry cell elements described in STEEL, Mar. 12, p. 79.

F. M. Marson, chief
Technical Intelligence Branch
Engineer Research & Development Laboratories
Fort Belvoir, Va.

• *Contact Eveready Div. of National Carbon Co.*

Financial Analysis Coming

When will STEEL's new financial analysis of the steel industry be ready?

Leo F. Carponi
Carponi Associates
New Haven, Conn.

• *The 1950 analysis, covering more than 90 per cent of the industry, is being compiled and will be published late this month.*

Naming Tin Platers

Please send a list of U. S. tin plate manufacturers.

A. Tanzi, president
Aurelio Tanzi Engineering Co.
Brooklyn, N. Y.

• *Companies producing tin plate are Jones & Laughlin Steel Corp.; Tennessee Coal, Iron & Railroad Co.; United States Steel Co; Granite City Steel Co.; Inland Steel Co.; Youngstown Sheet & Tube Co.; Republic Steel Corp.; Columbia Steel Co.; Bethlehem Steel Co., Weirton Steel Co.; and Wheeling Steel Corp.*

Special Report to Newark

Please send us a copy of STEEL's special report, "$120 Billion Metalworking Market Ahead," with the ten-year sales planning chart.

O. Papanek
Franklin Fader Co.
Newark, N. J.

More Packages—Less Men

We have a packaging situation similar to the one described in STEEL, Mar. 19, p. 52. Where can we obtain information on manufacturer, cost and delivery of the electronic packager shown in operation at Buick?

J. W. Whalen, purchasing agent
Fitzgerald Mfg. Co.
Torrington, Conn.

• *Write to Inter-Lakes Engineering Co., 4845 Bellevue, Detroit 7.*

The Metalworking Outlook

CMP: A Compromise

NPA Administrator Manly Fleischmann had to make some concessions to win the behind-the-scenes fight for a Controlled Materials Plan. The puzzling language in some sections of the announcement that CMP will start July 1 (p. 43) reveals that even the drafters don't know precisely how the program will be toned down from its original conception. Mr. Fleischmann wanted a CMP as near the World War II model as possible. Some of his industry advisers in steel, copper, and aluminum thought we could make shift with the controls we now have. As a result, we'll get a CMP but it probably will apply only to those rated programs already organized.

A Natural Remedy for Shortages?

Government officials and advisers who are against CMP use this argument: Steel, aluminum and copper scarcities are still severe, but it's possible that they will be partly relieved in the next few months by natural causes. Sales of automobiles and home appliances are declining—not enough yet to be noticeable in metal consumption, but the retail slackening will soon be felt as far back as the manufacturing operation if consumer sales continue to lag. Output of those items may decline to such an extent that even all of the restricted amounts of metal now permitted auto and appliance makers will not be needed.

Durable Inventories Soar

Watch your inventories. That's what people opposed to CMP were doing when they struggled to ward off the plan. As of Apr. 1, an average of 12.9 units were in each auto dealer's stocks, the highest figure in 14 months. Armco Steel Corp. Chairman Charles R. Hook says warehouses in many cities are "bursting with stocks" of appliances. Commerce Department reports that seasonally adjusted durable goods inventories in February were $6.9 billion, compared with $6.8 billion in January and $6.6 billion in December.

Needed: Stamina for the Long Pull

Inventories are unusually high. They may cause trouble if you can't weather the short run, but they could be a gold mine if you are set for the long pull. The U. S. buying public still has a lot of money to buy those inventories; it may be just waiting for a better time to purchase. The privately held money supply plus war savings outstanding now totals $230.2 billion, more than four times the 1929 level. Value of the gross national product has not quite tripled.

Solution for Rising Overhead

You may be able to reduce your overhead by getting into government business. Some companies thus far have steered clear of defense contracts because they could still get enough materials and could devote most of their output to civilian customers. But the civilian jobs are getting to be increasingly of the short-run variety and procurement expenses are rising. To get long runs and to reduce purchasing costs, one large Ohio manufacturer that up to now has delib-

Production-Engineering News—p. 71 The Market Outlook—p. 125

erately kept its defense business to 20 per cent of its total volume will try to boost the ratio to 40 per cent.

Wage Costs Continue Rise

The squeeze caused by price controls on one side and rising wage costs on the other is hurting manufacturers more and more. Straight-time hourly earnings in manufacturing had an average increase of 8.5 per cent in the year ended January, 1951. An estimated 2 to 3 per cent rise has come since January, largely because of more overtime, particularly in steel, automobile and appliance industries during March. In February when rail strikes permitted less overtime, hourly payments to steel wage earners averaged $1.916, an increase of 12.4 per cent over February, 1950, but a slight decline from the January average. On the steel industry payroll in February were 662,700, an alltime high.

Canada Expands in Steel

Canada, eighth largest steel producing country in 1950 with an output of 3.3 million tons, is rapidly enlarging its iron and steel making capacity and developing its vast raw materials reserves. In recent years, Canada has augmented its own annual steel production about one-third by imports of steel products from the U.S. An improvement program will bring the dominion's steel capacity to about 4.5 million tons, blast furnace capacity to nearly 3.5 million tons and will add new rolling mill facilities.

Iron Ore Scarcity?

Some steel producers fear a bad iron ore shortage, although ore mining companies claim they will weather the storm. Steelmen think that more ore will be needed—perhaps 150 million tons by 1955—because of the growing scarcity of scrap. At the moment, about 132.5 million tons of ore appears to be available by 1955, but that may be increased by larger shipments from Venezuela and Labrador . . . U.S. Steel Corp. vessels opened their Great Lakes ore season Apr. 11.

Straws in the Wind

A West Coast dealer offered to sell Warner & Swasey Co. about $2 million worth of W & S machine tools that he had bought as war surplus. About 80 per cent of the machine tool orders on Warner & Swasey's books carry priorities now . . . Without fee or profit, Reynolds Metals Co. will operate the U.S. Air Force's Manufacturing Methods Pilot Plant at Adrian, Mich. . . . Charging that this country has enough rubber for a five-year war without any further imports, Harry E. Humphries, president of U.S. Rubber, says the federal rubber controls are causing needless tire shortages and unemployment . . .

What Industry Is Doing

Brush makers expect a $55 million industrial business this year (p. 47) . . . P. R. Mallory and Sharon Steel formed a joint company to develop and produce titanium and titanium alloys (p. 46) . . . Firestone expects to deliver the first tank cannon in a $4.6 million Army Ordnance contract next month . . . Red tape is snarling the machine tool pool orders (p. 45) . . . Wondered where all the steel went last year? You'll find your answer in STEEL this week (pp. 54 and 55).

CMP—1951 Model

Last Friday morning, NPA Administrator Manly Fleischmann, announced the long-awaited controlled materials plan for steel, copper and aluminum to become effective July 1. More complete control over distribution became necessary when defense order ratings with superimposed directives degenerated into hunting licenses no more effective than the multiple priority system of World War II.

Unlike the full CMP which replaced the priority system in World War II, the new plan is "open-end" type which means that cashier's checks will be issued for materials required for defense and defense-support programs. Whatever is left can be distributed to manufacturers of civilian goods, within the restrictions of "M" and limitation orders.

At the outset, those with direct military, atomic energy and defense-related contracts will be required to file their requirements under CMP regulations. Manufacturers, except those making consumer durable goods, also are asked to file so NPA can gage their needs and measure the impact of the defense program on their production. Later, NPA may ask makers of some consumer durables to file also. Beginning with fourth quarter, CMP authorizations will be handled through field offices to cut down on paper work in Washington.

It is clear that NPA is feeling its way in trying to juggle available supplies of the three basic metals so that a dual economy can be maintained for an as yet undetermined period of years. After defense needs are sliced off, NPA believes that a rough balance between supply and demand for the amount left over for civilians can be maintained through judicious use of limitation orders already issued and others which may be written.

NPA is in the unenviable position of administering a distribution plan which is bound to result in widespread dissatisfaction, unwanted paper work, and a mad scramble for the remaining "free" material. Metalworking management cannot keep workers on the payroll and schedule production efficiently unless it knows where it stands from day to day on incoming materials. The open-end CMP, as now set up, may prove a logical step in development of a more workable plan for distributing scarce materials.

Irwin H. Such

EDITOR

WHERE THE STEEL GOES: Announcement of an open-end CMP makes figures just released by the American Iron & Steel Institute on shipments of finished steel to consumers all the more newsworthy because of the changes in distribution patterns now taking place.

In 1950, the auto builders got one out of every five tons of finished steel or 20.04 per cent. This was the biggest bite out of the

available supply in any postwar year, the industry's portion rising from 12.5 per cent in 1946 to 18.9 per cent in 1949. Measured by prewar years when the steel industry was looking for customers, however, the figures are not out of line, as autos have taken as much as 24 per cent.

Jobbers, dealers and distributors were second last year with 18.5 per cent, largest portion since 1946 and comparing with 17.5 per cent in 1949. Tonnagewise, jobbers fared considerably better in 1950 than the percentages indicate, since more steel was available—72.2 million tons compared with 58.1 million in 1949.

Construction took 12 per cent last year, largely in the form of plates, structurals and line pipe; containers 8 per cent; railroads 6 per cent; industrial machinery and domestic appliances each 5 per cent. The military took an insignificant 0.27 per cent.

This year, you can look for a different distribution picture, for nearly half of all available steel is going into direct military, defense support and essential civilian requirements. —p. 54

SOURCE FOR MATERIALS: Shrinking reserves of metallics in the U. S. and threatened supply lines to the Far East are focusing more attention on Latin America.

Iron ore already is moving to our Eastern Seaboard plants from newly developed deposits in Venezuela, and a wider, steady stream will be flowing this way by 1955. In addition, Chile has been a major source for copper for many years; Bolivia for tin; and the Guianas for bauxite. Other Latin American countries are becoming increasingly important sources for other minerals we need, including columbium, lead, zinc, mercury, uranium, tantalum and vanadium.

So, it is not surprising that Nelson Rockefeller's International Development Advisory Board finds that Latin America's undeveloped areas show the most promise of any in the world. Further aid will be granted under the Point 4 program, and you probably will find it easier to do business in South America under proposed revisions in regulations and trade agreements. —p. 53

SIX MILES A MINUTE—PLUS! It may not be too long before you can spend a full day in New York and still be back home in Chicago or an equally distant point in plenty of time for cocktails and dinner.

With new materials now becoming available, aircraft designers think that speeds in excess of 6 miles per minute for transports may soon become a reality. These materials include a new 230,000 psi chrome-moly steel, an aluminum alloy stronger than 75S, new titanium and magnesium alloys and improved stainless steels.

Fabrication is a problem which the aircraft industry is finding ways to lick. Present trend is away from forming materials at room temperatures, some being handled at elevated temperatures and others at subzero levels. —p. 77

HELP BUILD TANKS: Back in 1942 it became apparent that mobile ordnance such as tanks and gun carriers had to be redesigned if maximum efficiency in manufacture and in the field was to be attained.

Reworked designs could not be put into production while fighting was in progress, but since the end of the war, the Ordnance Corps has had the foresight to work out a "family theme" for all major tank-automotive components, including engines, transmissions, armament, fire control, suspensions, hydraulic and electrical accessories.

Gearing of production for the $3 billion vehicle program will require thousands of prime contractors, subcontractors, and suppliers. If you want to help build tanks, detailed technical, production and procurement information in addition to that in this issue may be obtained from the Detroit Tank Arsenal. —p. 72

BRUSHES FOR INDUSTRY: Significant but not altogether unsuspected events have been taking place in the brush industry.

This year some 20 companies will have sales of $55 million, or three times prewar volume. Biggest market no longer is for applying paint and varnish and sweeping floors. Now, 30 per cent of all industrial brushes are power driven and used for production purposes.

Aircraft engineers find that brushing reduces stress concentrations in metal parts and prevents subsequent failures. Another typical defense use is in removing excess rubber from tank treads. More universal applications include cleaning, polishing and deburring. Users range from the steel industry which needs 18-foot brushes for scrubbing strip, down to plants which use tiny ¼-inch brushes for cleaning jet engine parts.

You can look for further improvements in power brushing, including a method for feeding and cleaning small parts automatically. —p. 47

Cashier's check replaces DO hunting licenses when . . .

Open-End CMP Starts July 1

Defense producers to be assured necessary supplies of steel, copper and aluminum. Other manufacturers to scramble for what's left. Civilian cutbacks to continue

DEFENSE and defense-support industries will be enabled to write valid tickets for their steel, copper and aluminum requirements after July 1 when the new Controlled Materials Plan becomes effective.

Nondefense producers will scramble for what's left.

A substantial pool of the three basic materials will continue to be available to civilian goods producers, after the defense and defense-support requirements are filled. Some estimates contemplate the following set-asides for defense: Steel, 40 per cent; copper, 40 per cent; aluminum, 60 per cent. These are tentative, but are approximately in line with current rated requirements (A survey by STEEL, Apr. 9, p. 45, shows direct defense will take 18 per cent of steel in May and defense support will require 27 per cent, leaving 55 per cent available for civilian use).

Cashier's Check—National Production Authority, father of the CMP, says the new plan will provide defense and defense-support producers with a cashier's check on the known supply of the basic materials. NPA tacitly admits that DO ratings in recent weeks have become only hunting licenses for materials.

The new CMP bears many similarities to the program used during World War II and one important difference. The new plan will be an "open end" program, under which only a part of the available supply —enough to satisfy defense and support needs—will be programmed. The remainder will be available to whomever can get it. In World War II, practically all available supplies were programmed.

What It Does—CMP is a plan by which steel, copper and aluminum are allotted directly to producers on the basis of detailed requirements submitted in advance for the manufacture of goods which the government needs in the defense program.

The plan makes possible authorization of specific production schedules and firm allotments of the three basic metals to meet, but not exceed, defense production goals on schedule.

Phase 1 — First step in CMP operation will be the reporting to NPA by producers of their detailed requirements for the basic materials on forms which will be sent out in May.

Second phase will be the allotment of specific amounts of materials to producers starting July 1, after the Defense Production Administration determines the production programs necessary.

The defense agencies will weigh defense needs against capacity to produce, measure the impact of availability of materials for civilian consumer goods and take the steps desirable to maintain a healthy civilian economy.

"This will help us to foresee and hold to a minimum the industrial and employment dislocations, including those affecting small business," says Manly Fleischmann, NPA administrator.

Hardships Still—Mr. Fleischmann admits there is no way to avoid all the hardships created by an emergency defense production program. During the early stages of the program, DO ratings issued by NPA sufficed to channel materials to defense producers. Now that the requirements of the defense program have grown, these ratings have lost much of their power and are termed by many defense producers as hunting licenses only.

CMP is intended to provide an orderly distribution of the basic materials now and should the defense program have to be enlarged will provide a method for handling the increased load.

Who Will File—Manufacturers of military products, products for the Atomic Energy Commission and certain defense related construction projects will file their requirements under CMP regulations. Also required to file will be manufacturers of other products requiring steel, copper and aluminum, excepting consumer durable goods. This will be done so that NPA can gage their needs and measure the impact of the defense program on their production, whether such production is under CMP or not.

Consumer durable goods manufacturers will not file requirements, Mr. Fleischmann says. Repair shops will not file but will be covered by a special CMP regulation which will assure them of needed materials without application to NPA. Manufacturers of repair and replacement parts will be required to file.

The accompanying lists (page 44) are tentative. Definite lists and specific reporting instructions will be issued in May.

How It Operates — As in World War II, programmed products fall into two categories: "A" products and "B" products.

"A" products are those on which the most convenient method of production authorization is vertical. Producers of "A" products get their pro-

duction authorizations and material allotments from their customers. A prime contractor's customer is a government agency. A subcontractor's customer is a prime contractor or another subcontractor.

The "B" list programs will include products where it is most practical to provide authorization horizontally or directly to the producer. In general this list will include certain civilian type products, industrial machinery and equipment, and components which are needed for defense. Producers on the "B" list will obtain their authorizations and allotments from their NPA industry division.

On Local Level — After the first quarter of operation, CMP will be decentralized and handled through field offices. This was done in World War II. Manufacturers will work with local offices of the NPA (Department of Commerce).

Tested Method In essence CMP is a simple plan for authorizing and assuring the production of defense and supporting items. Under CMP, NPA will tell manufacturers what the government has to have, will supply a timetable for getting things done, and will give manufacturers authority to carry out the program.

This authority is expressed in terms of an authorized production schedule to obtain and use controlled materials and a preference rating on other materials and components needed to complete the job.

World War II demonstrated the workability of the CMP as a quantitative plan. It makes it possible to combine a wide range of essential needs into a common language, a common denominator, and then to match up needs with supply accurately.

The common denominators are the three basic materials—steel, copper and aluminum. One or more of these are used in most of the "hard goods" production and their forms and shapes can be traced back to the facilities which produce them.

Chain of Command —The CMP has an advantage in minimizing the need for centralized planning and supervision by closely following the normal chain of command in industry. A major share of responsibility for getting out the production is left to industry. It will be up to the producer with a contract for defense goods to allot controlled materials to his subcontractors and to schedule production so that all parts and components are ready on time and in the right quantities.

Flexible—NPA believes CMP is particularly suited for today's dual economy. Defense production is encouraged through CMP authorization. Civilian goods production is encouraged rather than discouraged.

For the present, CMP will be limited to defense and defense-support production. This will not require all the materials available. A substantial amount will be available for civilian output. A rough balance between supply and demand for the left-over material will be preserved by using other NPA powers, such as limitation orders to reduce less essential civilian production.

Distribution of the left-over materials will be the great and as yet unsolved problem of the new CMP.

Timetable — Producers affected by CMP will have until July 1 to brief themselves on procedures and regulations. Forms, operating instructions and the official "B" list will be available by May 1.

As details of the plan are worked out they will be explained in STEEL, and will be made available to trade associations, chambers of commerce and to individual businessmen.

Where To Go for Help

Manufacturers having difficulty getting scarce materials for production on defense-rated orders are urged to stop seeking help from the armed services. The place to go, says the Munitions Board, is to the local field offices of the National Production Authority.

Canada Tries Materials Controls

Canada's Department of Trade and Commerce, is installing an order approval system to conserve scarce materials. It is expected to be in full operation by midsummer.

Manufacturers of civilan goods seeking steel, base metals and other raw materials will have to obtain approval from the civilian supplies branch in the department.

UNDER CMP REGULATIONS producers of some products will have to file their steel, aluminum and copper requirements with NPA; on other products no filing of needs is required. The two tentative lists follow:

File Requirements On:

Agricultural machinery; construction and mining machinery; oil field machinery; machine tools, metalworking machinery and accessories, including welding and cutting apparatus; steam engines, steam and hydraulic turbines; pumps and compressors; conveyors and conveying equipment; elevators and escalators; fans and blowers, industrial; industrial trucks and tractors; mechanical power transmission equipment; heat exchangers, condensers, packaging machines, centrifugals and separators; hydraulic jacks and lubricating devices.

Motors and generators; switch gear and electrical control apparatus; electrical welding apparatus, including electrodes and welding rods; ships and vessels; locomotives; railroad and street cars; tractors; tin cans; fabricated structural steel products; tanks, boilers and cylinders; stamped and pressed metal products; valves and fittings, anti-friction bearings.

Food products machinery; textile machinery; woodworking machinery; paper making machinery; printing and publishing machinery; special industrial machinery, such as rubber, plastics, chemical, foundry, tobacco, glass, cotton, clay, cement, concrete products, etc; aircraft and aircraft parts; truck-trailers; metal shipping containers; screw machine products; industrial furnaces and ovens; mechanical stokers; office machines; scales and balances.

Commercial laundry and dry cleaning machinery; sewing machines except household; vacuum cleaners except household; refrigeration and air conditioning equipment, except household refrigerators and freezers and comfort air conditioning; measuring and dispensing pumps and lubrication equipment; commercial service equipment except household types; electrical wiring devices and supplies; carbon and graphite products; electrical indicating and measuring instruments; lighting fixtures.

Tacks, staples and cut nails and spikes; wire work products, such as wire cloth, wire chain and wire springs; safes and vaults; steel springs; bolts, nuts, rivets and other industrial fasteners; collapsible tubes; internal combustion engines; transformers; capacitors, rectifiers, induction and dielectric heating units; electrical accessory equipment for internal combustion engines; electric lamps, incandescent and fluorescent; radio, radar and television equipment, except home type; radio tubes; telephone and telegraph communication equipment; storage batteries; primary batteries, dry and wet; x-ray and therapeutic apparatus.

Motor vehicles except passenger type; small arms; small arms ammunition; cooperage; millwork, such as door frames, windows, etc.; prefabricated wooden buildings; fruit and vegetable baskets; wooden boxes; lasts; wood products such as ladders, tool handles, etc; mattress and bed springs; wood office furniture; metal office furniture; furniture for schools, churches, etc; professional furniture for laboratories, hospitals, but not beauty shop or barber shop; partitions, lockers and shelving; window and door screens; restaurant furniture.

Paperboard boxes; fiber cans, tubes and drums; periodicals; books; commercial printing; loose leaf binders; tires and inner tubes; rubber footwear; mechanical rubber goods; leather belting; shoe findings; luggage; saddlery and harness; flat glass products; concrete products (reinforced); abrasive products; insulation, packing and gaskets; cutlery; edge tools; hand tools; files and rasps; hand saws and blades; other hardware; plumbing fixtures; oil burners; heating and cooking equipment except residential; metal doors and sash, frame, etc.; sheet metal products such as roofing, culverts, etc., except awnings and radiator enclosures.

Farm wagons, wheelbarrows and hand carts; aircraft, scientific and surveying instruments; mechanical measuring and controlling instruments; optical instruments and goods; dental, surgical and medical instruments and appliances; photographic equipment; clocks and watches; pens and pencils; marking devices; buttons, needles, pins and fasteners; brooms and brushes; morticians' goods; fire fighting equipment; repair and replacement parts.

Don't File Requirements On:

Motor vehicles—passenger type; household refrigerators and freezers and comfort air conditioning; heating and cooking equipment—residential; household electrical appliances; vending and amusement machines; sewing machines — household; vacuum cleaners — household; home radio and television sets; automobile trailers (not incl. truck or house trailers).

Sheet metal awnings and radiator enclosures; venetian blinds; household furniture; professional furniture for beauty and barber shops; window shades; women's hand bags; small leather goods; household stamped and pressed metal products (including enameled); domestic laundry machinery; household service equipment, such as dishwashing machines, water softeners, polishing machines; motorcycles and bicycles.

Jewelry and jewelry findings, silver and plated ware; pianos, organs, musical instruments and parts; games and toys, children's vehicles; dolls; sporting and athletic goods; artist materials; costume jewelry; artificial flowers; lamp shades; barber and beauty shop equipment; signs and advertising displays; umbrellas and canes; cigaret holders and tobacco pipes; soda fountain and beer dispensing equipment.

Red Tape Ties Up Machine Pool Orders

Less than a third of the $350 million worth of such orders that the government planned for tool builders to set up a backlog for future needs are being placed

PLACING of machine tool "pool" orders is being held up by government red tape.

Of approximately $350 million worth of such orders which the government plans to place with builders to set up a backlog of equipment in anticipation of coming defense requirements, only about $100 million worth are being placed now.

As long as this impasse lasts, the authorizing agency, the National Production Authority, is confining pool orders to the types of tools most urgently needed, so that the $100 million now available will prevent occurrence of such bottlenecks as would cause major delays in the defense production program.

Four New Orders—Orders just placed by the procurement agency, General Services Administration, come to $15,266,252, and have been placed with four manufacturers. Orders previously placed (see STEEL, Apr. 2, p. 53) went to 13 manufacturers and came to $63,177,019. This makes a total of $78,443,371 of orders placed, leaving about $21.5 million immediately available for further commitments.

The four new orders went to these companies, in the amounts shown: Cincinnati Gilbert Tool Co., Cincinnati, $1,113,600; Fellows Gear Shaper Co., Springfield, Vt., $6,622,577; Lees-Bradner Co., Cleveland, $2,246,100; March Machinery Co., New York, $5,283,975. The government does not release data on the tools involved in such orders.

Under NPA Order M-41, manufacturers apply any defense orders they receive against GSA's purchase order; those remaining unsold will be bought by GSA. Manufacturers are free to charge their full price for machine tools sold to defense contractors, whereas payment by GSA for unsold tools is the sales price less 17½ per cent which covers estimated profit and selling expense. In other words, GSA will acquire the unsold tools at cost.

Tools for Britain—Expectations of large British machine tool requirements under the MDAP (Mutual Defense Assistance Program) are being borne out by demands now before the NPA. Like the machine tools for the United States defense program, the British defense requirements get a DO priority rating. Priorities already have been approved for about 3000 machine tools for the United Kingdom, and this is only the first batch.

Biggest gripe of the machine tool industry is the tardiness of the Office of Price Stabilization in finalizing its regulation covering prices on machinery including machine tools. It generally is assumed that the formula will be substantially as follows: The freeze price will be the maximum price in the second quarter of 1950 plus increases in all factory labor costs plus increases in direct materials costs, but not including increases in other expenses as cost of engineering service, administration and overhead.

But until the time OPS issues its regulation, machine tool builders will be uncertain about the all-important matter of price, and hence will be handicapped in arranging contracts for their raw materials and components.

How does the materials situation look as far as machine tool builders are concerned? In general, say NPA officials, machine tool builders, aside from the price uncertainty factor, are not suffering from any shortages except in welding rod and electrodes.

Tool Problems Aired at Westinghouse Forum

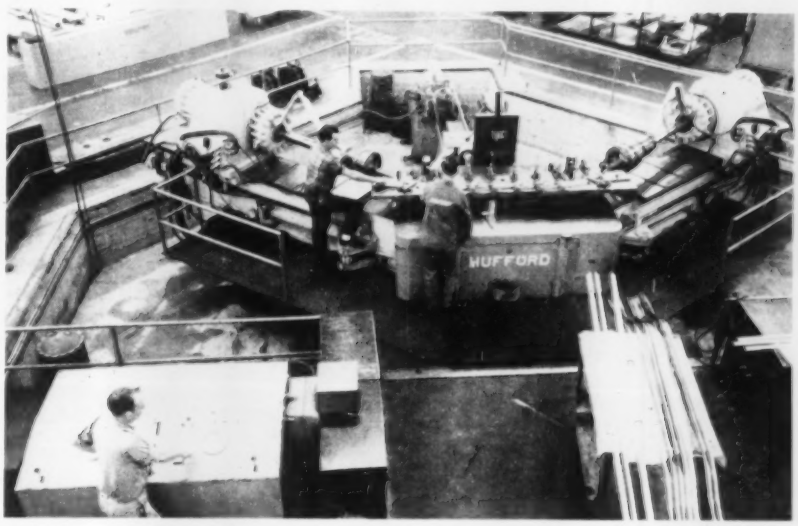
MACHINE TOOL producers must do two things to overcome production difficulties brought on by the defense program: 1. Resort to substitute materials and simplified designs; and 2. break down manufacturing operations so that men and women of limited skills can be more widely employed in machine tool building.

That's what Myron S. Curtis, director of engineering, Warner & Swasey Co., Cleveland, said in a talk at the Machine Tool Electrification Forum last week in Pittsburgh under sponsorship of Westinghouse Electric Corp.

Commenting on government pool orders for machine tools, Tell Berna, general manager of the National Machine Tool Builders' Association, Cleveland, said they do the machine tool builder little good today, since they are put at the end of his production schedules.

"It is not priorities for materials for machines to be built two years off that concerns the machine tool builder," Mr. Berna said. "It is the difficulty of getting materials for the machines that are on his assembly floor right now."

Further obstacles in the way of production expansion, Mr. Berna explained, are reluctance of the govern-



A STRETCH SAVES TIME: This manufacturing technique employed at the Wichita, Kans., division of Boeing Airplane Co. saves plenty of time in turning out cam tracks—devices used in raising and lowering wing flaps of the B-47 Stratojet. Raw extrusions are first machined to engineering dimensions on a Farnham mill and then stretched and bent into shape on a large Hufford stretch press. The operation was formerly performed with a hydraulically-controlled duplicator

NEA

FIRESTONE READIES PLANT 3 TO MAKE TANK CANNON
. . . 110 freight cars were needed to move in special machinery

ment to grant machine tool builders certificates of necessity, and the failure of government to advance 25 per cent cash with pool orders as was done in World War II. "Furthermore, the machine tool builder cannot borrow against a pool contract because of a recent ruling of the controller general of the United States which makes that type of loan unacceptable to a commercial bank," Mr. Berna pointed out.

Tool and Die Shipments Rise

Tool and die shipments during the first quarter of this year were 150 per cent over the same quarter last year and a further gain is expected in the second quarter, the National Tool & Die Manufacturers Association reports. Orders for the first quarter were 165 per cent ahead of the corresponding period of last year.

Employment has not increased as rapidly as would be expected; skilled labor needed for precision tool and die making is not available, and employment has risen less than 25 per cent. The labor situation is expected to become tighter and much concern is directed to labor pirating.

Dollar volume of tools and dies produced in 1950 is estimated as $325 million.

Vacation Shutdown Opposed

Subcontractors for United Aircraft Corp.'s Pratt & Whitney Division at East Hartford, Conn., are being asked to avoid general vacation closings so deliveries on essential parts may be maintained. The division has canceled its regular shop vacation shutdown.

Firestone Fires Away

The tire and rubber company will start deliveries of the weapons next month

ROUND-THE-CLOCK activity at Firestone Tire & Rubber Co., Akron, is necessary to convert Plant 3 into a heavy duty machine shop for tank cannon. Initial order from Army Ordnance totals $4.6 million, with delivery scheduled to begin in May.

Special machine tools for the work required 110 freight cars to move them into Akron from 16 government arsenals where they had been stored since World War II. Forgings and castings for barrels, breech blocks and breech rings being supplied by Ordnance are of a new alloy steel developed since the war. The machine shop will use a total of 160 pieces of equipment specially designed for gun boring, honing, rifling, milling and shaping parts of the big cannon.

Firestone workmen must first demothball the equipment. Then it is aligned and put into condition for operation. More than 600 employees will be needed when production starts.

Tin Savings Made

Progress in stretching the supply of tin is closely allied with growth of electrolytic methods of tin application. Steel companies coated 4.7 million tons of tin and terne plate in 1950 of which 60 per cent was applied electrolytically. The progress made in tin conservation is shown by the use of 20 per cent less tin to accomplish this record tonnage.

Although the proportion of electrolytic plate has increased, the ratio of tin to tin plate has decreased. Greater control over the electrolytic process allows thinner and more uniform coatings which has resulted in the savings. Certain foods and other products high in acid content require relatively heavy coatings which can be profitably produced only by the hot dip process. Utilization of hot dipping process offsets in part the gains made by electrolytic means, but both processes are essential to the type coating desired.

Coincidental with the advent of cold rolling strips of black plate for tinning, the composition of steel for tin plate was improved. These developments extended the life of some canned products as much as 300 per cent.

Some new developments in coating processes promise further conservation of tin. Thinner coatings on one side than on the other are already in use. Synthetic coating for black plate without utilization of tin would provide additional savings. These developments allow continuation of the large use of cans and containers for packaging.

Titanium Company Formed

P. R. Mallory & Co. Inc., Indianapolis, and Sharon Steel Corp., Sharon, Pa., formed a jointly owned company to develop, produce and market titanium and titanium alloys. The organization will be known as Mallory-Sharon Titanium Corp. and each company will have a 50 per cent interest.

The new company will offer a series of proprietary alloys to meet demands of various industries and for the immediate future, the armed services. Offices will be located initially in Indianapolis.

P. R. Mallory was elected chairman of the board with James A. Roemer of Sharon Steel as president, F. H. Vandenburgh of Mallory as vice president and general manager, E. N. Crosier of Sharon Steel as treasurer and assistant secretary, and George Fotheringham of Mallory as secretary and assistant treasurer.

The Mallory company has been active in titanium research for the last decade and performed extensive development work for the U. S. Navy Bureau of Aeronautics on titanium alloys. Mallory company has both research laboratory facilities and an engineering staff qualified to handle the titanium alloy project, and is establishing production melting facilities. Niles Rolling Mill Co., Niles, O., subsidiary of Sharon Steel has considerable experience in rolling titanium sheets.

Brushing Up Business

Shortages of wire are preventing sales of industrial brushes from climbing even more

ABOUT 20 U. S. companies manufacture a product used in virtually all of the 50,286 metalworking plants in America.

Makers of brushes for industry—used in production, maintenance and painting—expect a $55 million sales level in 1951 (see the chart). That's nearly three times the prewar volume. Among the factors contributing to the growth, these two stand out: Metalworking's expansion which enables the brush industry to grow with it and far wider application of brushes for industrial production than before the war.

Big User—Today, 30 per cent of all industrial brushes made are power driven and are for production purposes; 30 per cent are for paint and varnish; 2 per cent are for miscellaneous uses; and the rest are for maintenance. The proportion going for production is still increasing and accounts for much of the gain in sales of industrial brushes generally.

Here are the major jobs power driven brushes can do: Remove burrs and sharp edges; break corners and form radii; rough rubber or metal to provide a better adhesive surface when joining rubber parts; remove scratches and tool marks from highly stressed parts such as connecting rods and crankshafts; clean and polish metal surfaces of all kinds; remove paint and varnish, weld slag and rust, scale from hot and cold forgings, insulation from electric wire or hardening scale from gears; polish and finish metals and plated parts; clean rusted and pitted plates, boilers, tanks and buckets.

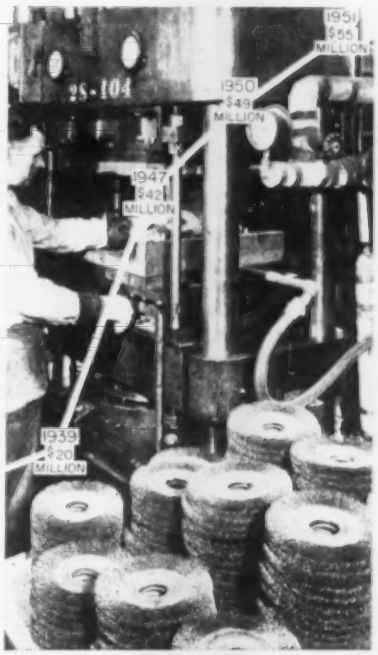
Defense Tool—A brush's faculty for removing scratches and tool marks accounts for the fact that brush manufacturers are producing heavily for defense. An estimated 20 per cent of the industry's output is going for defense, and the ratio is rising rapidly. Brushes are used in finishing aircraft parts subject to high stress. Some 90 per cent of the parts in aircraft reciprocating engines are brushed. Aircraft people find that brushing reduces stress concentration and consequently metal breakage. Another defense use, among many, is in removing excess rubber from tank tracks.

Among the largest consumers of brushes are the aircraft, automotive, farm equipment, steel and rubber industries. One rubber company has 95 operations using brushes. A producer of nonferrous metals uses 30 different brushing operations. Brushes from ¼ inch to 18 feet long are made, used on jobs varying from scrubbing strip steel to brushing jet engine parts.

Four Types—Power-driven brushes are of four basic designs: The wheel brush, the cup type, the end brush and the brush roll. There are endless variations on those four types, engineered according to specific requirements. Much of the industry's volume is for specially designed brushes. Deliveries now average three to five weeks, compared to just a few days a year ago.

The shipment delays are caused by material shortages. About 78 per cent of the power brushes are made from wire, 17 per cent from fiber and 5 per cent from miscellaneous materials including nylon, textile cords and horse hair. Material shortages are holding down the productive capacity of the industry. Stainless steel wire—used to brush stainless steel sheets and strip—and silicon bronze wire—used for sparkless brushing of gas storage tanks—are particularly hard to get.

High Shine on Brush Sales



All figures are STEEL estimates.

More Scrap Needed for Steel

The steel industry must have more scrap to maintain and increase its record high production, American Iron & Steel Institute says.

Each day in 1950 the iron and steel industry used about 149,000 tons of scrap. The total for the year was above 54 million tons. About 68,000 tons of that daily requirement came from outside the steel industry.

By the end of 1952 the steel industry will require 5 to 7 million more tons of purchased scrap annually than was consumed in 1950.

Where will that scrap come from? That question is still unsolved by the institute's Committee on Iron & Steel Scrap and other groups working on the problem.

Steel Ingot Production Sets Record

STEEL PRODUCTION exceeded 9 million tons a month for the first time in history during March, 1951, says American Iron & Steel Institute.

Steelmaking furnaces poured 9,050,000 tons of ingots and steel for castings, an increase of 16.5 per cent over February and 21 per cent over March, 1950. This record tonnage caused the production in the first quarter, totaling 25,658,868 tons, to be the largest ever attained. The March output is equal to more than 106,500,000 tons annually.

Operations averaged 102.2 per cent of capacity for the month, indicating that steel companies are getting benefits from their large expansion and improvement programs. Record tonnage averaged 291,935 tons per day. Total output for March was nearly 207,000 tons higher than the production of January, 1951, previously the greatest month.

Cold Sheets Lead Shipments

Cold-rolled sheets accounted for more tonnage than any other product in February shipments of finished steel from mills. Hot-rolled bars were second and hot-rolled sheets third. Cold-rolled sheets totaled 768,737 tons, 13.3 per cent of total mill shipments of finished steel, the American Iron & Steel Institute reports. Hot-rolled bars accounted for 644,115 tons, or 11.2 per cent. Hot-rolled sheet shipments aggregated 638,058 tons, or 11.1 per cent.

Period 1951	Open-hearth Net Tons	Open-hearth % Capac.	Bessemer Net Tons	Bessemer % Capac.	Electric Net Tons	Electric % Capac.	Total Net Tons	Total % Capac.	Calculated Net Tons Weekly	No. weeks in mo.
Jan.	*7,844,982	101.4	431,725	90.4	566,460	88.3	8,843,167	99.9	1,996,200	4.43
*Feb.	6,935,512	99.3	326,112	75.6	504,077	87.0	7,765,701	97.1	1,941,425	4.0
†Mar.	8,061,000	104.2	409,000	85.6	580,000	90.4	9,050,000	102.2	2,043,000	4.43
†1st Quarter	22,841,494	101.7	1,166,837	84.2	1,650,537	88.6	25,658,868	99.8	1,995,246	12.86

Note—The percentages of capacity operated are calculated on weekly capacities of 1,746,337 net tons open-hearth, 107,806 net tons bessemer and 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of Jan. 1, 1951, as follows: Open-hearth 91,054,020 net tons; bessemer 5,621,000 net tons; electric 7,554,630 net tons; total 104,229,650 net tons.
* Revised. † Preliminary figures, subject to revision.

Attention Contractors

ASPR Section XIII will tell you the duties you owe the government on defense work

IMPORTANT to defense contractors and subcontractors is the newly completed Section XIII of the Armed Services Procurement Regulation. It covers the use of government property which may consist of materials, production equipment, special tooling or industrial facilities of one kind or another and includes an appendix "Manual for Control of Government Property in Possession of Contractors." Copies will soon be obtainable at a nominal price still to be set from the Superintendent of Documents, Government Printing Office, Washington 25.

In general, the policy of the armed services is that contractors will furnish all materials and all industrial facilities, and that the armed services will furnish the specialized tooling required to perform the contract. The section continues the existing policy that the government is the self-insurer of its own property, but it imposes on the contractor the obligation to "maintain and administer, in accordance with sound industrial practice, a program for the maintenance, repair, protection and preservation of the government property, so as to assure its full availability and usefulness for the performance of the contract."

The section dispenses with the duplicate records heretofore maintained by the Army and Air Force and their contractors for industrial property. It provides that the three services will utilize the contractor's system of property control, subject only to audit and verification by the government's contract administration officers.

Navy Picks 52 Ship Salvagers

The Navy estimates that 52 United States firms, at most, can be considered as potential contractors to salvage sunken and beached vessels in the Pacific.

These firms have been advised, if they are interested, to furnish full information to the High Commissioner of the Territory of the Pacific Islands, Honolulu, T. H., by May 15 as to what they can do. After that the High Commissioner will proceed to the negotiation of actual contracts.

It is estimated that the first lot of vessels to be salvaged—at Palau, Saipan and Truk—represent about 400,000 tons of scrap metal. After contracts for those areas have been arranged, similar action will be taken with respect to ships in other Pacific areas.

Information about the whole program can be obtained from Comdr. R. W. Sauer, Office of Naval Material, 1617 T-3 Building, Navy Department, Washington 25. Commander Sauer can be reached by phone on LIberty 5-6700, Extension 64141.

STEEL's Weekly List of Subcontract Opportunities

GOVERNMENT security restrictions hide the size of prime defense contracts but there is no let-up in the number of them announced from Washington.

Nash-Kelvinator Corp. reports it will produce "a large number" of Pratt & Whitney 18-cylinder radial air-cooled engines of 2100 horsepower under a letter of intent order from the Air Force.

Production of radar equipment for the Navy under an $8.5 million contract is the first major defense commitment for Westinghouse Electric Corp.'s Springfield, Mass., plant. More than half the contract value will go for materials and supplies furnished by subcontractors.

Buick Motor Division of General Motors Corp. farmed out two more parts to its J-65 jet engine project. Another GM division, Oldsmobile, reports it will make the compressor and turbine units in a 700,000-square-foot building to be constructed in Lansing, Mich.

In other awards, American Safety Razor Co. says it will operate the La Porte, Ind., shell loading plant of the Kingsbury Ordnance District under an $8 million contract. Buffalo Arms Inc. has a $4 million award to produce machine guns in a plant to be built near Buffalo, and Rheem Mfg. Co. is tooling its New Orleans facility to turn out a $10 million order for artillery ammunition.

Other government awards to metalworking companies, of interest to subcontractors, are included in STEEL's weekly summary:

PRODUCT	CONTRACTOR
Surface Finish Air Gages	Sheffield Corp., Dayton, O.
Topping Machines (for 105 mm shells)	Vertex Co., New York
Vertical Turret Lathes	Bullard Co., Bridgeport, Conn.
Ram Type Turret Lathes	Warner & Swasey Co., Cleveland
Lathes (shockproof construction)	Reed-Prentice Corp., Worcester, Mass.
Radial Drills	Carlton Machine Tool Co., Cincinnati
Milling Machines	Cincinnati Milling & Grinding Machines Inc., Cincinnati Kearney & Trecker Corp., Milwaukee Cincinnati Milling & Grinding Machines, Inc., Cincinnati
Universal Grinders (14 x48")	Brown & Sharpe Mfg. Co., Providence, R. I.
Surface Grinders (8 x24")	Tubular Micrometer Co., St. James, Minn.
Calipers	Barnes Mfg. Co., Mansfield, O.
Pumps (50 cpm)	Seaman Motors Inc., Milwaukee
Rotary Mixers	Hartman Corp., St. Louis
Pneumatic Jacks	Aeronautical Machinery Corp., Chicago
Universal Tail Jacks	Yale & Towne Mfg. Co., Philadelphia
Chain Hoists (pull & lift type)	Griffin Engineering Co. Inc., Worthington, Ind.
Periscope Assemblies	S. W. Farber Inc., New York
Head Metal Parts for 3.5" Rocket	Pontiac Div., General Motors Corp., Detroit
Rockets, HS 4.5	Parsons Corp., Detroit
Activator Assemblies	Schramm Inc., West Chester, Pa.
Compressors	Caterpillar Tractor Co., Peoria, Ill.
Road Graders	Galion Iron Works, Galion, O.
Road Rollers	International Harvester Co., Melrose Park, Ill.
Tractors	Jacques Power Saw Co., Denison, Tex.
Earth Augers	LeTourneau Inc., Peoria, Ill.
Rooters	Baldwin-Lima-Hamilton Corp., Lima, O.
Cranes & Attachments	Unit Crane & Shovel Corp., Milwaukee Thew Shovel Co., Lorain, O. Young Welding & Dragline Co., Baton Rouge, La. C. S. Johnson Co., Champaign, Ill. Pettibone-Mulliken Co., Chicago Wayne Crane Div., National Steel Dredge Co., Ft. Wayne, Ind.
Cranes & Booms	Browning Crane & Shovel Co., Cleveland
Crane Shovels with Attachments	Quickway Truck Shovel Co., Denver, Colo. Schield Bantam Co., Waverly, Iowa Four Wheel Drive Pacific Co., Los Angeles Bucyrus-Erie Co., Milwaukee
Boat & Airplane Crane Machinery	M. L. Bayard Co., Philadelphia
Gears	Active Gear Co., Chicago
Speedometer Unit Assemblies	AC Spark Plug Div., General Motors Corp., Flint, Mich.
Cab Closures (hard top)	Meyers Aircraft Co., Tecumseh, Mich.
Yokes, Forks, Gaskets & Gears	Northwestern Auto Parts Co., Minneapolis
Dolly Assemblies	Climax Machinery Co., Indianapolis
Portable Air Compressors	Ingersoll-Rand Co., Cincinnati
Transmitting Tubes, Type 809	RCA Victor Div., Radio Corp. of America, Harrison, N. J.
Electronic Tubes (type 2J42)	Sylvania Electric Products Co., Boston
Electric Motors, Controllers & Switches	Raytheon Mfg. Co., Waltham, Mass.
Telegraph Terminal Sets	Watson Elevator Co. Inc., New York
Generators, A. C., Diesel Engine Driven	Teletype Corp., Chicago Buda Co., Harvey, Ill. Consolidated Diesel Electric Corp., Stamford, Conn. Diesel Engine Div., General Motors Corp., Cleveland
Generators, Gasoline Engine Driven	D. W. Onan & Sons Inc., Minneapolis
Generator Sets	Fairbanks Morse & Co., Chicago Chicago Pneumatic Tool Co., New York United States Motor Corp., Oshkosh, Wis.
Ammeters	Roller-Smith Div., Realty & Industrial Corp., Bethlehem, Pa.
Transmitter Assemblies (cl-16M)	Wilcox Electric Co. Inc., Kansas City, Mo.
Transmitters	United States Gage Div., American Machine & Metals Inc., Sellersville, Pa.
Amplifiers	Maxson Engineering Div., W. L. Maxson Corp., New York
Radio Receivers	Aircraft Radio Corp., Boonton, N. J.
Bomb Racks	Crosley Div., Avco Mfg. Corp., Cincinnati
Power Plants	Lycoming-Spencer Div., Avco Mfg. Corp., Cincinnati
Helicopter Velocity Instruments	Cornell Aeronautical Laboratory Inc., Buffalo, N. Y.
Gyro Horizon Indicators	Sperry Gyroscope Co., Long Island, N. Y.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to U. S. Commerce Department, Division of Printing Services, attention E. E. Vivian, Room 6225, Commerce Bldg., Washington 25. For ESA orders, write J. L. Miller, Economic Stabilization Agency, Room H367, Temporary E Bldg., Washington 25.

Materials Orders

TIN—Amendment of Apr. 6, 1951, to NPA Order M-25 reduces can quotas for certain packs and raises quotas for a few food items, increases flexibility of can quota system, and sets up a preference system, beginning with the second quarter of 1951, under which can manufacturers unable to fill all orders are required to schedule production operations so deliveries can be made in sequences stipulated in the amendment.

CHEMICALS—Schedule 2 to NPA Order M-45 puts poly tetra-fluor ethylene (Teflon) under complete allocation May 1, 1951.

IRON & STEEL—Amendment of Apr. 6, 1951, to NPA Order M-1 places virtually complete control over use of scarce ferroalloys through NPA analysis of monthly melting schedules of users. The schedules must be filed with NPA 30 days in advance of the month in which the alloys are scheduled for melting, beginning May 1 for June meltings.

RUBBER—Amendment of Apr. 6, 1951, to NPA Order M-2 permits spare tires for new passenger automobiles purchased under military or other defense-rated orders. Amendment effective Apr. 1, 1951.

COLUMBIUM & TANTALUM — Amendment of Apr. 6, 1951, to NPA Order M-3 stipulates that defense-rated orders for columbium bearing and columbium-tantalum bearing steels for the aircraft program must not be filled unless they have approval from the Aircraft Production Resources Agency, a Department of Defense unit.

ALUMINUM—Amendment of Apr. 6, 1951, to NPA Order M-7 shifts control of aluminum closures from the basic aluminum order (M-7) to the packaging closures order, M-26, to simplify administration. Amendment effective Apr. 6, 1951.

CLOSURES—Amendment of Apr. 6, 1951, to NPA Order M-26 takes over from M-7 the control of aluminum closures. Amendment effective Apr. 6, 1951.

COPPER—Amendment of Apr. 9, 1951, to NPA Order M-50 authorizes electric utility companies to use DO-48 priority rating to obtain copper products. The order originally provided similar assistance only in procurement of aluminum. Amendment effective Apr. 9, 1951.

COPPER—Amendment of Apr. 9, 1951, to NPA Order M-12 exempts electric utilities from its provisions as far as use of the copper products specified in M-50 are concerned.

TUNGSTEN—MO-6 issued Apr. 5, 1951, by Defense Minerals Administration places government controls on tungsten ore as well as tungsten concentrates. The order supersedes a temporary order (MO-4) of Feb. 15, 1951, covering tungsten concentrates only.

Price Regulations

General Overriding Regulation 2, effective Apr. 9, 1951, authorizes suppliers to sell to the U. S. Government at prices in line with current ceilings for the same commodities when sold to other purchasers. In many cases, contracts for government supplies are for 12 months with awards being made three months prior to the effective date. The General Ceiling Price Regulation freezing prices and government contracts had the effect of rolling back such prices as much as 15 months and froze prices for new contracts calling for deliveries through June, 1952, at these levels. These prices were totally unrealistic and are not representative of today's market, with the result that normal sources of supply are closed to federal agencies.

MILITARY COMMODITIES—Amendment 5 to Supplementary Regulation 1 to the General Ceiling Price Regulation extends to May 1, 1951, temporary exemption from the General Ceiling Price Regulation of commodities and services normally produced and supplied only for military use. Amendment effective Apr. 1, 1951.

TUNGSTEN CONCENTRATES—Ceiling Price Regulation 19, effective Apr. 6, 1951, sets a ceiling price of $65 a net ton for sales and deliveries of tungsten concentrates.

Delegation

Amendment of Apr. 3, 1951 to NPA Delegation 7 adds Louisville to the list of U. S. Department of Commerce field offices authorized to act on applications for commencement of commercial construction. Amendment effective Apr. 3, 1951.

NEA

EASY DOES IT: Rotor of a 65,000 horsepower motor is set in place at the Grand Coulee Dam, Wash., pumping plant. Built by General Electric Co., the rotor weighs over 150 tons and must be lowered gently into place by twin cranes working in unison. The motor will power a pump for irrigation of the Columbia Basin Project

Coonley Gets Conservation Job

Howard Coonley, industrialist and former president of the National Association of Manufacturers, will supervise and direct all conservation activities of the government. He is director of a new inter-agency setup known as the Conservation Division of DPA. He is in Room 211B, Old GAO (General Accounting Office) building, and can be reached by phone on STerling 9200, Extension 3888. He had a similar job in World War II.

One of Mr. Coonley's first self-assigned tasks will be to explore the possibility of reducing the amount of materials and labor required in all types of building, including homes and heavy construction. Speakers at a recent forum estimated that building requirements of both materials and labor can be reduced by 25 to 30 per cent. Mr. Coonley has ordered an intensive study; if such savings are feasible, he says, they should be put into practice without delay to save critical materials and critical labor.

What can each individual management do to advance the cause of conservation? Mr. Coonley believes the possibilities here are enormous. He pointed out the fine job which has been undertaken by RCA-Victor (STEEL, Apr. 2, p. 80). All companies, Mr. Coonley believes, could launch such programs with great resulting benefits to themselves as well as to the defense production program. Intelligent conservation-salvage programs, he says, make for efficiency and a sound financial picture.

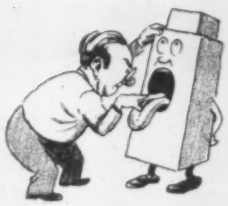
Fire for the Fuels

To intensify research activities in coal, synthetic liquid fuels, petroleum and natural gas, the Bureau of Mines made two top appointments. Dr. Arno C. Fieldner was appointed chief fuels technologist on the staff of Director James Boyd. Dr. Louis C. McCabe succeeded Dr. Fieldner as chief of the bureau's Fuels & Explosives Division. Both have been with the bureau for many years.

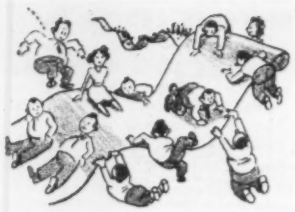
Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

GOVERNMENT PROTECTION
. . . wanted for inventors



MANGANESE IN STEEL
. . . how much is needed?



WHAT'S THE PERCENTAGE?
. . . people on federal payroll

METALLIC MINERALS
. . . guarded for the future

ALL WROUGHT UP over the Justice Department's view that all rights to inventions made in the course of executing government contracts should be assigned to the government and not left to the private ownership of the contractors, the National Inventors Council made a firm decision. The council — Charles E. Kettering, General Motors vice president, is chairman — decided to call on the President, Congress and all interested and influential government officials to assure inventors that their rights under the American patent system will be protected. The council fears if incentive were removed (that would be the case if the Justice Department's proposal were carried out) the defense program would suffer.

Oddly Enough Even though socialist governments are in the saddle in the United Kingdom and France, representatives of those countries in the Mutual Defense Assistance Pact (MDAP) agreed in principle to the concept that private firms furnishing technical "know-how" for the manufacture of arms in the various MDAP countries should be rewarded for the use of their inventions.

How Much Manganese in Steel?

The Bureau of Mines Experiment station at Redding, Calif., is hard at work these days on a study that may have a profound effect on steel production — particularly on the problem of how much manganese is needed in steel. Some of the questions the bureau's metallurgists are trying to answer are: What's the minimum manganese content for steels of varying sulphur content (including those known as free-machining steels)? Can steel free of sulphur be produced without any manganese at all? Excellent forging characteristics were demonstrated with steel with as little as 0.001 per cent sulphur and a combined total of 0.008 per cent for silicon, manganese, carbon, phosphorus and sulphur.

The experiment station is about ready to get a laboratory-size mill rolling so it can study the crumbling point of steels with different sulphur-manganese contents. United Engineering & Foundry is supplying the mill.

The 6 Per Centers . . .

The number of federal employees is increasing at a rate of more than 2200 a day. So reports—perhaps appropriately—the Joint Committee on Reduction of Nonessential Federal Expenditures. Sen. Harry F. Byrd (Dem., Va.) is chairman. Civilian employees of the federal government, not including uniformed members of the armed services, numbered 2,307,904 on Feb. 28. Assuming that about one in every four persons in the United States is gainfully employed, a little more than 6 per cent of the working population was on the payroll of the federal government at end of February.

Freed for the Bigger Jobs . . .

So they can use their full facilities on new production, machine tool manufacturers will not be used for rebuilding and reconditioning tools in the Army, Navy and Air Force reserves when that can be avoided. The Munitions Board told the three services to distribute such work as much as possible among small shops and rebuilders. Such a distribution of the work of rehabilitating machine tools is in line with the overriding policy of awarding a fair share of the armed services' procurement to small business.

Materials in the Long Range . . .

What national policies are needed to safeguard our supply of essential raw materials from the long-range point of view? That's the question President Truman handed to a new Washington group. Its designation: The President's Materials Policy Committee. Chairman is William Paley, president of the Columbia Broadcasting System. His right-hand assistant is Eric Hodgins, widely known as the author of the successful book entitled "Mr. Blandings Builds His Dream House." Major studies will have to do with the supply of metallic minerals. Temporarily located at 1740 G St., N. W., Washington, the committee soon will be moved into the Executive Office Bldg. next to the White House.

A Hand in Handling . . .

To give adequate attention to the materials problems of the materials handling equipment manufacturing industry, a Materials Handling Section has been set up in the National Production Authority's Machinery Division. Chief of the section is Joe H. Peritz, formerly with Lamson Conveyor Co., Syracuse, N. Y. He is at 2146 Temporary T Bldg., Washington; his phone number is STerling 9200, Extension 3860.

Industry Men in NPA . . .

More industry men have been placed in key positions in NPA's Iron & Steel Division. R. J. Wysor, former president, Republic Steel Corp., Cleveland, is assistant director in charge of facilities expansion. E. J. Hergenroether, International Nickel Co. Inc., Detroit, is assistant director in charge of metallurgy and conservation. Norman W. Foy, Republic Steel Corp., Cleveland, is assistant director in charge of production. Dr. James H. Critchett, Electro Metallurgical Corp., New York, formerly chief of the Ferroalloys Section, was made assistant director in charge of ferroalloys.

Naval Research . . .

Dr. Emanuel R. Piore is the new deputy chief and chief scientist of the Office of Naval Research, succeeding Dr. Alan W. Waterman, now director of the National Science Foundation.

New Focus on Latin America

Southern North America and South America have many of the minerals we lack, so watch for new Point 4 and trade emphasis on that area

WATCH for the U. S. government to put increased emphasis on trade with Latin America.

Latin America has most of the critical minerals we lack and is closer to us than other areas which also have the scarce materials. Point 4 programs will concentrate on the American republics, and regulations and trade agreements can be expected to encourage private commerce.

Big Market—A report to the President by the International Development Advisory Board, chairmanned by Nelson Rockefeller, reveals that Latin America has a population of 157,728,000 people. The average exports from 1948 to 1950 from the U. S. to Latin America were $3 billion a year. Imports into the U. S. averaged $2.7 billion. The U. S. buys about 42 per cent of all Latin America's exports, Western Europe buys 31 per cent and other areas 27 per cent. In 1949 the region's total exports were $6.1 billion. Of all its imports, the U. S. supplies 55 per cent, Western Europe 27 per cent and other countries 18 per cent. In 1949 Latin America imported $5.1 billion worth of goods.

Of all the underdeveloped areas of the world, Latin America shows the most promise. Both its exports and imports exceed those of Africa, the Middle East, South Asia and Southeast Asia. Africa appears to be the next most promising on the basis of foreign trade. Its 1949 exports were $3.1 billion, imports $4.5 billion. On the basis of population, Africa (198.3 million), South Asia (464.9 million) and Southeast Asia (187.8 million) appear more promising than Latin America.

Materials Bank — Latin American nations and the scarce materials they can supply the U. S. are: Antimony—Bolivia, Mexico; beryllium ore—Brazil; cadmium—Mexico; mercury—Mexico; platinum group of metals—Colombia; tantalum ore—Brazil; tin—Bolivia; tungsten ore and concentrates — Bolivia; uranium — Brazil; graphite—Mexico; quartz crystals—Brazil; copper—Chile, Mexico; lead ore, pigs, bars, scrap and dross — Mexico, Peru.

In 1949, Latin America supplied 80 per cent of the total $3.8 million in imports of antimony into the U. S.; 1 per cent of the $957,000 worth of asbestos; 85 per cent of the $16.4 million worth of bauxite; 87 per cent of the $858,000 worth of beryllium; 77 per cent of the $834,000 worth of bismuth; 84 per cent of the $1.9 million worth of cadmium; 31 per cent of the $24.2 million worth of chromite; 71 per cent of the $219.0 million worth of copper; 2 per cent of the $17.6 million worth of industrial diamonds; 85 per cent of the $1.5 million worth of fluorspar; 44 per cent of the $1.3 million worth of graphite; 54 per cent of the $121.6 million worth of lead; 29 per cent of the $26.8 million worth of manganese ore; 7 per cent of the $6.8 million worth of mercury; 17 per cent of the $8.6 million worth of platinum; 98 per cent of the $1.5 million worth of quartz crystals; 48 per cent of the $78.2 million worth of tin ore; 35 per cent of the $401,000 worth of tin alloys; 61 per cent of the $16 million worth of zinc ores; 100 per cent of the $272,000 worth of vanadium ore or concentrates; 7 per cent of the $6.4 million worth of tungsten ore; 21 per cent of the $637,000 worth of zirconium ores.

Mexican Mill Expands

One of Mexico's major steel mills, Altos Hornos de Mexico, S.A., of Monclova, Coahuila, is doubling its capacity to produce steel strip.

The firm has ordered from Westinghouse Electric International Co. electric equipment to drive a new hot strip finishing mill and new tinning and shearing lines. A 3000-horsepower main drive motor, a 2500 kilowatt motor-generator set, switchgear, auxiliary motors and controls and ventilating equipment have been ordered for the mill. A 4000 horsepower turbine was ordered to supply electricity for the plant.

Brazil's Future Bright

Koppers Co. Inc. is going to design, engineer and supervise construction of a blast furnace and battery of 21 chemical-recovery coke ovens for Brazilian National Steel Co. at Volta Redonda, Brazil.

The new 25-foot hearth diameter blast furnace will more than double the Brazil plant's potential pig iron capacity. The new battery will carbonize 612 tons of coal per day, increasing the plant's carbonizing capacity to 2212 tons daily.

Included in the contract are additions and alterations to the coal chemicals' plant to accommodate the additional capacity.

Brazil's industrial expansion was marked during 1950 and manufacturing output reached new peaks in several lines. The government is concentrating on improving production of manganese, but actual output increases won't appear for a year or two.

In 1951, most attention will be paid to improvement of the transportation system, expansion of electric power output and development of agricultural resources.

Authenticated

PIPELINE PUPILS: Anglo-Iranian Oil Co.'s apprentice training shop in Abadan, Iran, provides an encouraging example of what can be done to improve labor conditions in an economically undeveloped country. The petroleum workers have better living and working conditions than most other workers in Iran

Where Did 1950's Steel Go? Here's the Breakdown

The No. 1 consumer of steel, the auto industry still tops the list. Last year it beat its 1949 tonnage and percentage

THE AUTOMOBILE industry, the nation's largest single consumer of steel, not only retained its No. 1 position in 1950 but took more both percentagewise and tonnagewise than in 1949.

A tabulation just completed for 1950 by the American Iron & Steel Institute shows the steel industry's shipments of all grades of finished steel that year to the auto industry totaled 14,472,707 net tons, 20.04 per cent of the total mill shipments of 72,232,292 tons. In 1949, mill shipments to the auto industry totaled 10,962,894 tons, 18.87 per cent of total mill shipments of 58,104,010 tons.

Second largest outlet for mill shipments of finished steel are jobbers, dealers and distributors. In 1950 they received 13,359,724 net tons, 18.50 per cent of all mill shipments. Third largest outlet was the construction industry (including maintenance), which took 8,602,083 tons, or 11.91 per cent of the mills' total shipments of finished steel.

While the automobile industry is the largest consumer of carbon, stainless and alloy (other than stainless) steels, it is not in all cases the largest recipient. Jobbers, dealers and distributors got the most carbon steel, 12,921,247 tons. Second largest taker was the automotive industry, which received 12,489,435 tons. Jobbers, dealers and distributors received more stainless steel too than any other group, shipments to them totaling 108,320 tons. Next was the automotive class, with 81,800 net tons.

The automotive industry was by far the largest taker of alloy steel (other than stainless). It received 1,901,472

DISTRIBUTION OF FINISHED STEEL PRODUCTS

In net tons of products of all grades, including alloy and stainless

Market Classification	Ingots, Blooms, and Seamless Billets, Slabs, Sheet Bars, Tube Rounds	Skelp	Wire Rods	Structural Shapes (Heavy)	Steel Piling	Plates	Standard Rails (over 60 lb)	Rails (all other)	Joint Bars	Tie Plates
Converters, Processors	1,304,193	13,904	287,442	116,488	60	310,699	110		866	3
Forgings (except automotive)	668,102		1,263			9,554				
Bolts, Nuts, Rivets, Screws	23,434		307,746			3,492				
Jobbers, Dealers, Distributors	70,532		41,493	789,691	23,171	886,239	10,087	16,867	1,671	3,011
Construction, Maintenance	70,999		18,929	2,249,012	287,999	1,355,224	52,784	8,156	1,554	4,528
Contractors' Products	3,837		31,015	14,313		166,148				
Automotive	546,071		31,716	33,327		428,446	75			
Rail Transportation	32,704		805	364,025	243	749,923	1,528,032	13,730	94,954	397,988
Shipbuilding, Marine Equipment	4,649			62,280	3,237	210,387	147	322		
Aircraft	8,616			1,135		3,560				
Oil and Gas Drilling	52,771			40,156	801	116,278				
Mining, Quarrying, Lumbering	2,881		27	26,167	1,186	68,731	13,688	49,082	3,254	2,420
Agricultural	33,074		15,027	57,471		135,807				
Machinery, Industrial Equip., Tools	130,711		42,987	226,508		878,957	3,492	3,276	226	67
Electrical Machinery and Equipment	2,482		10,861	20,714		142,606				
Appliances, Utensils, Cutlery	236		85	1,237		7,770				
Other Domestic and Commercial Equip.	2,141		8,850	4,086		12,851				
Containers	5,460		869	331		23,779				
Ordnance and Other Military	20,520		470	12,507	197	24,466	1	51		
Export	34,390	109,484	7,747	172,253	25,383	120,502	96,827	3,179	8,582	8,226
Unclassified	104,353		9,223	5,952		21,675		21,726	2,569	15
Total	3,122,156	123,388	816,555	4,197,653	342,277	5,677,094	1,705,243	116,389	113,676	416,258

Market Classification	Mechanical Tubing	Pressure Tubing	Wire, Drawn	Nails and Staples	Wire, Barbed and Twisted	Woven Wire Fence	Bale Ties	Black Plate	Tin and Terne Plate (hot-dipped)	Tin and Terne Plate (electrolytic)
Converters, Processors	6,339	3,889	901,648	4,845	702	212	119	7,476	488	980
Forgings, (except automotive)										
Bolts, Nuts, Rivets, Screws			364,124							
Jobbers, Dealers, Distributors	125,853	67,484	268,883	812,612	217,452	465,928	78,960	67,129	34,528	51,684
Construction, Maintenance	27,517	12,456	55,516	12,995	4,789	5,416	156	8,677	3,328	5,330
Contractors' Products	24,674	10,250	55,919	1,133	58	25		29,780	4,580	733
Automotive	151,978	125	322,387	1,546				19,205	3,789	3,658
Rail Transportation	2,958	4,963	1,977	5,146	493	1,605			475	
Shipbuilding, Marine Equipment	1,145	1,358	290	32		26				29
Aircraft	3,192	418	645	89						6
Oil and Gas Drilling	3,093	154	187	11					100	50
Mining, Quarrying, Lumbering	1,573	164	1,284	1,010	99	117			150	
Agricultural	36,200	95	30,323	670	143	152		539	198	1,961
Machinery, Industrial Equip., Tools	193,178	40,525	128,652	3,543				6,859	6,370	5,970
Electrical Machinery and Equipment	10,669	760	78,443	587	8			8,207	3,691	869
Appliances, Utensils, Cutlery	7,295	7,888	57,396	520				75,176	12,327	16,338
Other Domestic and Commercial Equip.	51,227	25	334,565	1,719				84,945	14,275	7,417
Containers	1,527	18	91,137	12,790	9		3,407	233,352	1,433,110	2,647,924
Ordnance and Other Military	4,768	102	3,400	3,029	1,806	18	665		1,508	71
Export	6,281	8,242	34,704	4,356	10,574	4,719	111	20,732	392,651	97,579
Unclassified	84,425	89,882	135,996	7,837	1,471	5,702	413			
Total	743,892	248,798	2,867,476	874,470	237,604	483,920	83,831	562,077	1,911,568	2,840,599

net tons. Next was the machinery, industrial equipment and tool classification. To it went 528,078 tons.

Largest single tonnage product of all grades of steel (carbon, alloy and stainless) in 1950 was cold-rolled sheets. They accounted for 9,338,312 net tons. Next was hot-rolled bars, including light shapes, the tonnage being 8,017,465. In third place were hot-rolled sheets with 7,804,948 tons. Biggest recipient of each of these products was the automotive industry.

Leading product in the alloy steels (not including stainless) was hot-rolled bars, their tonnage being 1,959,925. Next was electrical sheets and strip, their tonnage totaling 606,060.

Cold-rolled strip and sheets accounted for well over half of all stainless steel. Of the 449,380 net tons of stainless shipped from mills last year, 171,968 tons were in cold-rolled strip and 109,279 tons were in cold-rolled sheets.

Additional details on mill shipments of finished steel in 1951 are shown in the accompanying tables.

Where Alloy, Stainless Steel Went

	Alloy (other than stainless) —net tons—	Stainless —net tons—
Converters, Processors	67,928	40,294
Forgings (except automotive)	419,663	9,290
Bolt, Nuts, Rivets, Screws	78,304	4,272
Jobbers, Dealers, Distributors	330,157	108,320
Construction, Maintenance	88,842	5,310
Contractors' Products	40,996	11,421
Automotive	1,901,472	81,800
Rail Transportation	166,493	3,824
Shipbuilding, Marine Equipment	18,357	1,167
Aircraft	27,732	11,942
Oil and Gas Drilling	140,369	880
Mining, Quarrying, Lumbering	18,297	401
Agricultural	50,531	277
Machinery, Industrial Equip., Tools	528,078	27,240
Electrical Machinery and Equipment	498,011	17,906
Appliances, Utensils, Cutlery	43,942	45,747
Other Domestic and Commercial Equip.	24,571	10,271
Containers	16,906	4,516
Ordnance and Other Military	41,534	1,909
Export	87,248	11,892
Unclassified	135,901	50,701
Total	4,725,332	449,380

BY MARKET CLASSIFICATION DURING 1950

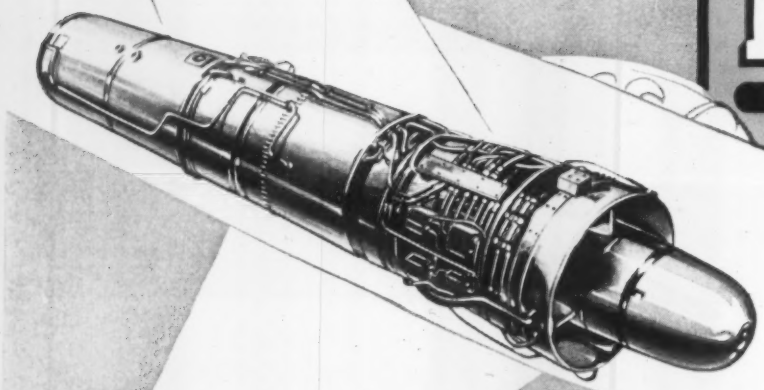
Tables compiled by STEEL from American Iron & Steel Institute figures.

Track Spikes	Wheels	Axles	Bars, Hot-Rolled (and light shapes)	Bars, Concrete Reinforcing	Bars, Cold-Finished	Bars, Tool Steel	Standard Pipe	Oil Country Goods	Line Pipe	
3			215,428	708	12,066	91	13,248	1,090	610	Converters, Processors
			399,614		2,967	809				Forgings, (except automotive)
			539,947		102,547	128				Bolts, Nuts, Rivets, Screws
9,278	57		1,109,478	873,866	390,722	14,369	1,887,135	1,331,012	666,766	Jobbers, Dealers, Distributors
1,585	5,682	1,150	489,347	647,592	4,072	270	121,468	26,392	2,521,936	Construction, Maintenance
			287,079	14,326	16,013	7	131,231	20	6,854	Contractors' Products
			2,652,389		481,004	369	2,497		140	Automotive
119,671	247,184	123,304	255,178	4,104	7,324	90	11,521		532	Rail Transportation
19	9		21,086	47	1,866	3	4,905		2,875	Shipbuilding, Marine Equipment
			13,251		8,472	39	216		31	Aircraft
			123,293	56	5,175		8,185	211,420	30,841	Oil and Gas Drilling
2,204	2,115	405	74,924	1,609	3,351	601	3,804	793	3,321	Mining, Quarrying, Lumbering
			571,021	1,030	96,461	67	28,009		2,211	Agricultural
202	6,786	716	749,283		278,600	13,761	27,118	191	23,857	Machinery, Industrial Equip., Tools
	1		111,440		41,021	133	180,630		1,118	Electrical Machinery and Equipment
			21,815		49,287	335	12,380		459	Appliances, Utensils, Cutlery
			101,354	23	46,080	104	5,665		410	Other Domestic and Commercial Equip.
			22,179		86		3,701		496	Containers
6			20,801		7,539	37	1,623		2,101	Ordnance and Other Military
5,764	6,828	750	78,961	32,225	9,804	481	114,967	112,962	396,652	Export
		4,276	159,597	98,493	60,388	58,169	41,515	8,941	7,363	Unclassified
138,732	268,662	130,601	8,017,465	1,674,079	1,624,845	89,863	2,599,818	1,692,821	3,668,511	Total

Sheets, Hot-Rolled	Sheets, Cold-Rolled	Sheets, Galvanized	Coated Sheets (all other)	Enameling Sheets	Electrical Sheets and Strip	Strip, Hot-Rolled	Strip, Cold-Rolled	Net Total	Per Cent of Total	
286,285	92,102	30,486	2,187	1,546	40	203,875	79,558	3,899,786	5.40	Converters, Processors
								1,082,309	1.50	Forgings (except automotive)
52,170	3,568	16				3,492	9,347	1,410,011	1.95	Bolts, Nuts, Rivets, Screws
959,112	902,245	898,765	30,091	6,062	8,455	131,357	107,679	13,359,724	18.50	Jobbers, Dealers, Distributors
284,014	80,947	138,639	1,364	2,009	45	62,794	27,412	8,602,083	11.91	Construction, Maintenance
762,889	563,399	604,850	16,769	41,978	1,664	118,973	166,678	3,075,195	4.26	Contractors' Products
3,033,363	5,165,025	52,436	126,410	4,773	12,440	817,504	582,034	14,472,707	20.04	Automotive
216,769	24,687	37,971	39	5	14,264	33,183	3,499	4,299,346	5.95	Rail Transportation
6,267	1,839	3,876	155		18	379	167	327,413	0.45	Shipbuilding, Marine Equipment
2,632	5,616	768	15	1	571	200	2,124	51,535	0.07	Aircraft
25,048	642	927		10	57	1,127	62	620,444	0.86	Oil and Gas Drilling
16,024	2,512	1,619	25		143	3,617	402	289,302	0.40	Mining, Quarrying, Lumbering
206,825	68,953	127,226	4,364	1,970	104	109,076	8,731	1,537,708	2.13	Agricultural
357,470	95,954	32,020	6,906	700	4,806	124,937	79,268	3,473,896	4.81	Machinery, Industrial Equip., Tools
173,724	160,954	25,334	8,191	5,174	582,995	76,252	189,768	1,836,632	2.54	Electrical Machinery and Equipment
312,205	979,455	104,318	21,558	175,453	34,063	28,528	161,729	2,087,853	2.89	Appliances, Utensils, Cutlery
161,742	583,134	46,598	9,930	8,282	5,241	66,340	247,445	1,804,449	2.50	Other Domestic and Commercial Equip.
679,762	376,559	58,133	2,793	22		174,470	139,250	5,911,164	8.18	Containers
42,207	16,304	540	133	1	507	14,705	14,531	194,614	0.27	Ordnance and Other Military
220,103	205,529	88,710	7,011	3,526	49,260	40,775	25,643	2,566,473	3.55	Export
6,337	8,888	8,809		5,254	1,919	319,199	49,261	1,329,648	1.84	Unclassified
7,804,948	9,338,312	2,262,041	237,941	256,766	716,592	2,330,783	1,894,588	72,232,292	100.00	Total

Another First for...

N-A-X
ALLOY STEELS



The use of N-A-X ALLOY STEEL in Aircraft Gas Turbines saves up to 50 per cent of critical Stainless Steel.

Conservation is possible – without sacrifice with use of N-A-X ALLOY STEELS

With the demand for greatly increased quantities of the critical and strategic Stainless Steels used in Jet Engines intensified by the acceleration of the building program, the Air Force requested the producers of these engines to seek *suitable* material with less critical alloy content to replace the Stainless Steel for certain moderate temperature application in these aircraft gas turbines.

The steel selected had to be of low-alloy content with high strength and good welding characteristics. Ordinary low carbon steel did not meet the requirements because of its low tensile properties and the fact that it could not be satisfactorily welded by the inert arc process, which is widely used in aircraft gas turbine manufacture.

The data available from tests made on several weldable low-alloy, high-strength steels indicated that N-A-X ALLOY STEEL was the most satisfactory of the group — *its selection followed.* Unlike other possible substitutes, N-A-X ALLOY STEEL has good low temperature impact values, maintains its higher strength and is not subject to temper brittleness in the wide operating temperature range required of the steel for this purpose — from a low of −70°F. to +800°F.

The use of N-A-X ALLOY STEEL for this application has cut the amount of Stainless Steel required in half. This is of considerable importance to the Air Force.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division — Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

NATIONAL STEEL

By H. C. TUTTLE Detroit Editor

Mirrors of Motordom

Auto sales continue to lag. April inventories are at 12.9 units per dealer, the highest figure in the last 14 months. Scare buying last fall blamed

DETROIT

A MULTITUDE of excuses have been used to explain the poor performance of automobile dealers in the last four weeks. By lumping these together it is possible to come up with the words for several verses of a song entitled "The Order Taker's Lament." It might go like this:

Our display room's getting crowded.
Our lot will hold no more.
Our prospects did their buying
When Korean Reds made war.

The factory still keeps shipping,
The used car market's dead.
Why don't they take the ceiling off,
Give us a floor instead.

Now comes fifth-tire trouble.
We charge the going rate.
The gravy that is in it,
Isn't worth the buyer's hate.

We know car cuts are coming,
At least that's our impression.
If something doesn't happen quick,
Bankruptcy court's in session.

Stocked Up—Up to now the easier situation in new cars has been spotty and has lacked substantiating figures. *Automotive News*, however, has completed a field survey of dealers' stocks and cars in transit and comes up with an average new car inventory per dealer of 12.9 units as of Apr. 1, the highest figures in 14 months. This is not an overly large inventory for the beginning of the spring buying season, but many authorities agree that the usual spring buying took place last fall when buyers feared production would be stopped. Most industry experts believe the market will absorb all the cars that can be built this year, but many, at the same time, agree that super-salesmanship will be needed.

In a frank expression on this subject R. H. Appleman, assistant general sales manager of Chrysler Division, told a group of Louisiana dealers recently that "tremendous effort in many cases is going to be required to sell the cars that we can make."

Back to Selling—Predicting a continuance of car production, which might be allowed even in event of total war because of dependence on private cars, Mr. Appleman asserted that production will not automatically be followed by sales this year. "I submit," he declared, "that we are about to enter into another era of that wonderful force that built the industry—salesmanship."

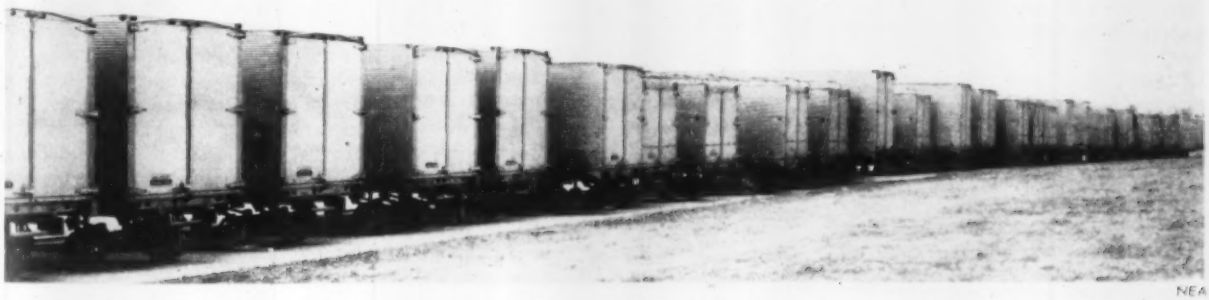
Speaking about the changes in cars which will result from materials shortages, he said he doubted there would be any wool for upholstery, "come next fall or winter." Plated parts also are due for a change. By eliminating the layer of nickel and by plating chrome directly over copper-plated steel," a very presentable result is obtained." This finish, however, is much more porous and will need attention if it is not to rust.

The Exception—An apparent exception to the sales slowdown appears to be Kaiser-Frazer Corp., whose retail sales in first quarter were 20.5 per cent higher than in the last quarter of last year. March sales were 21 per cent higher than February's. Growing demand for Henry J's accounted for much of the pre-spring sales upsurge, Walter deMartini, K-F sales vice president explained. Export sales set a new quarterly peak.

R. L. Polk & Co., industry statistical firm, is not aware from its calculations that sales are slipping. Reporting on February's new car registrations, the company says that the approximately 435,000 units which went into buyers' hands set an all-time record for that month. Previous February peak was in 1950 when 408,990 new cars were licensed. If March registrations are in the neighborhood of 440,000 units, Polk figures that the 1,350,000 three-month total would exceed that for the like 1950 period. Truck registration likewise set a new February record, approximating 80,000 units.

GM Emphasis on Trucks

A roaring good production pace was maintained by General Motors Corp. in its United States plants throughout the quarter, but the emphasis was swinging in favor of trucks. Through March, passenger car output totaled 673,454 units, compared with 690,294 in the same 1950 period. Truck and bus output was 154,268 units in the period, compared with 144,688 for the 1950 first quarter. The 2.4 per cent decline in passenger car output thus was almost wiped out, the corporation spewing out a total of 827,722 vehicles through



NEA

FOR WANT OF A TIRE: While truckers plead for more trailers to haul urgently-needed war goods, truck-trailer manufacturers can deliver only a fraction of their production for lack of tires. Stored on plane parking strips at Baer Field municipal airport in Ft. Wayne, Ind., are some of nearly a thousand such units held up at the nearby Fruehauf Trailer Co. plant because there aren't enough tires to equip them for waiting customers. Some operators have shipped their own tires to Ft. Wayne to hasten delivery, but even that procedure is slowing down

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March this year, against an 834,982 unit total last year.

Normally the previous quarter's production gives a good clue to the coming period. Such, of course, is not the case this quarter as Apr. 1 marked the beginning of several restrictive orders on materials consumption and had an immediate effect on the operations of several producers. In the first week of activity under the steel cutback order *Ward's Automotive Reports* noted that General Motors dropped from 41 per cent of the industry's U. S. output to 38 per cent. Ford also is expected to show substantially lower production in April than in March. Several independents and Chrysler, however, appear to be swinging along as though they never heard of NPA Order M-47. For the week ended Apr. 7, 12 per cent fewer vehicles were produced in U. S. plants than in the closing week of March. With Canadian output stepped up, total production for the week was estimated at 163,874, against 184,469 for the Mar. 31 week. A year ago, when Chrysler was strikemired, 133,172 vehicles were produced in U. S. and Canadian plants.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,878
February	658,918	505,593
March	791,884*	610,680
April		585,705
May		732,161
June		897,853
July		746,801
August		842,335
September		760,847
October		796,010
November		633,874
December		671,622

Weekly Estimates

Week Ended	1951	1950
Mar. 17	182,781	134,453
Mar. 24	174,674	140,196
Mar. 31	184,469	139,821
Apr. 7	163,874	133,172
Apr. 14	168,000	147,657

Estimates by Ward's Automotive Reports

* Preliminary.

Rubber Won't Stretch

Some very bitter words have been spoken since the rubber situation began to deteriorate. About the only suggestion which remains to be made to impress on Washington officials the seriousness of the condition is for the jobless rubber workers to drive a caravan of tire-less trucks and trailers down Pennsylvania Avenue for the planners to see.

P. W. Litchfield, Goodyear Tire & Rubber Co. chairman, outlined the plight to the Senate subcommittee for rubber in this manner: allocation is necessary, there is not enough rubber available to take care of full civilian requirements and at the same time build the stockpile as rapidly as demanded. The civilian rubber requirements—exclusive of latex—in 1951 are 1,036,000 tons. Available for civilian production will be 308,000 tons of natural and 670,000 tons of synthetic, leaving a deficit of 58,000 tons. In this year Goodyear estimates that natural rubber imports to the U. S. will be 900,000 tons. With synthetic production estimated at 850,000 tons for the year, the total available will be 1,750,000 tons. Estimating the military and civilian consumption at 1,300,00 tons, Mr. Litchfield says 450,000 tons can be stockpiled.

How the available rubber has been divided among the industry's members, however, is what Mr. Litchfield criticizes most. Most companies testifying before the Senate group had the same complaint of discrimination in the allocation. In Goodyear's case, he declared, the company has received 11 per cent less rubber in fourth quarter, 1950, than its percentage of the base year entitled it to. In first quarter, 1951, 11.5 per cent less than its share was allotted, he charged. While the entire industry's civilian consumption of new dry rubber in the six-month period ended in March at 1.2 billion pounds, 105.6 per cent of its base period, Goodyear's consumption was held to 93.6 per cent of base. This discrimination, he charged, adds up to a loss to Goodyear production employees of $2,950,000.

His recommendations: Adhere to a base period of allocation under thoroughly established rules; allocate 96,000 tons of dry rubber per month for civilian use by industry throughout second quarter—this comparing with 85,000 tons in March; slow down the rate of stockpiling of natural rubber in third quarter if the military situation permits; and increase synthetic production.

New Book on Autos

Filling a void in literature about mass manufacturing methods for automobiles is a new book entitled *Production of Motor Vehicles*. Authors are Henry M. Cunningham, now on the Munitions Board of the Defense Department, but formerly a staff member of the Automobile Manufacturers Association, and William F. Sherman, manager of engineering and technical department, AMA. Its foreward is by George W. Mason, AMA President. Publisher is McGraw-Hill Book Co. Inc., New York.

It was written primarily from first-hand observation of the practices of the various companies in the industry. Using scheduling forms, work orders, cost sheets, and the like which are typical, the book avoids specific mention of the way ABC Co. does it as compared with XYZ's methods. This failure to use specific cases will probably be a disappointment to officials who might want to study some of their competitors' methods.

When seen by the average reader, however, the generalizations have no vagueness. The book takes the reader through the steps involved in the initial conception of a new model, detailing the sales forecasts, consumer surveys, prototype building, etc. It tackles description of the administrative and technical problems relating to proposed changes, how costs are determined in advance and then their revision as the changeover approaches.

Ford Establishes Lab

A new scientific laboratory has been established by Ford Motor Co. to operate separately from its engineering research activities. Director of the laboratory is Andrew A. Kucher, who is well known for his inventions in the fields of refrigeration and aircraft design and construction. Mr. Kucher has been manager of research engineering for Frigidaire Division, General Motors, and vice president in charge of research for Bendix Aviation Corp. He will be on the staff of Ford's vice president in charge of engineering, Harold T. Youngren.

25 Miles Per Gallon

To the question "How can I get better gas mileage?" Les Viland, winner of the Mobilgas Grand Canyon economy run who got 25.448 miles per gallon with a Lincoln, has this answer—Keep a light foot on the throttle, particularly when starting up, shifting gears and before the car is warm. Savings of up to 50 per cent in consumption can be realized. Drive relaxed, and make all driving as smooth as possible. Avoid surging the throttle and never overload the engine. Use the right oil weight, keep the air filter clean, use tire inflation recommended by the manufacturer, watch chassis, rear end and transmission lubrication carefully, check brakes and battery connections.

The Business Trend

Industrial production index drops, quickly reflecting the effective date of end-use restrictions on steel. Cutback is readily apparent in automobile output figures

GRAPHIC EVIDENCE of the defense program's squeeze on civilian output is shown in STEEL's industrial production index for the first time in the week ended Apr. 7.

The week the index dropped 6 points as producers of passenger automobiles pared output to conform with end-use restrictions that became effective on steel with arrival of the second quarter of the year. The 6-point drop cut the index down to 218 per cent of the 1936-1939 average. That is the lowest level since the week ended Feb. 10, when the railroad switchmen's strike was a depressant. The 224 per cent level registered by the index in the week ended Mar. 31 just before slipping off the 6 points was only 1 point below the postwar record of 225.

Slowdown for Autos . . .

The automobile industry's cutback lowered total production of passenger cars and trucks in the United States and Canada in the week ended Apr. 7 to 163,924 units, lowest since the week ended Feb. 10 when the industry was handicapped by the railroad switchmen's strike. In the week ended Mar. 31 the auto industry's total output was 184,494.

While truck production fell off about 4000 units in the week ended Apr. 7 the output of passenger cars dropped by approximately 16,000 units, *Ward's Automotive Reports* shows. Truck production, however, is not limited by the government's end-use restrictions on steel. Since the first of the year, truck production has been at record-breaking levels and it is headed even higher. March, with 139,690 trucks completed in U. S. plants, tops the all-time high of 138,479 built in March, 1948, and April is expected to yield 145,000 civilian trucks, says *Ward's Reports*.

Total production of the automobile industry in the U. S. and Canada in March was 791,884 units, compared with 657,674 in February. Part of the figure for February is the result of a short month and the railroad switchmen's strike but a lot of the gain in March stems from the industry's effort to turn out as many passenger cars as possible before the end-use restrictions on steel for passenger automobiles became effective Apr. 1.

Steel: Still Above Capacity . . .

Still rolling forward at above-capacity rates is production of steel for ingots and castings. The week ended Apr. 14 was to be the sixth consecutive one at above theoretical capacity levels. In that week, output was scheduled to be 2,045,000 net tons, just 2000 tons less than in the week ended Apr. 7, the American Iron & Steel Institute said.

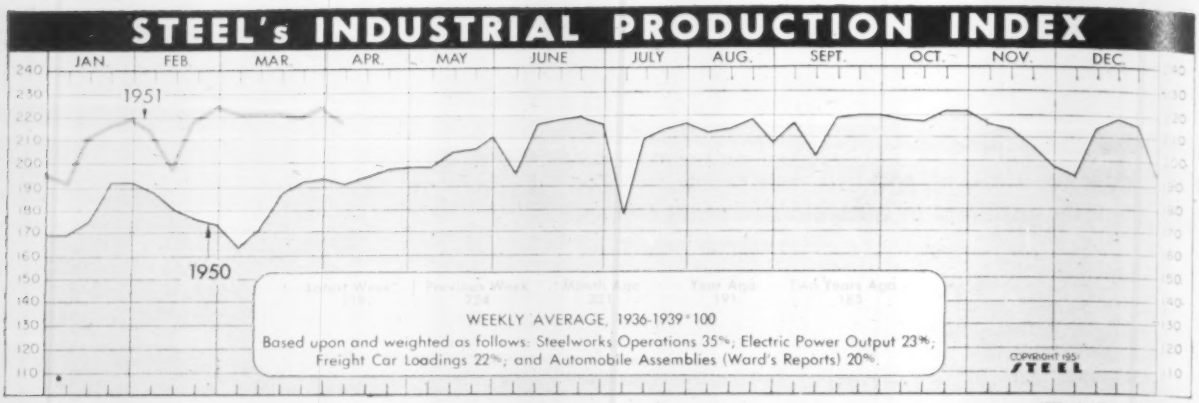
More Power for Everybody . . .

Seasonal declines are being recorded in the electric power production industry but this year's weekly electricity output figures continue to run approximately 14.5 per cent ahead of those for the comparable weeks of last year. The gain results from

1. The step-up in industrial produc-

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	103.0	103.5	101.0	97.5
	Electric Power Distributed (million kilowatt hours)	6,736	6,767	6,795	5,898
	Bituminous Coal Production (daily av.—1000 tons)	1,689	1,687	1,857	2,033
	Petroleum Production (daily av.—1000 bbl)	6,12.	6,041	6,047	4,998
	Construction Volume (ENR—Unit $1,000,000)	$236.8	$414.9	$258.9	$252.6
	Automobile and Truck Output (Ward's—number units)	163,924	184,494	180,577	133,172
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,986,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	750†	755	750	700
	Business Failures (Dun & Bradstreet, number)	195	136	153	203
	Currency in Circulation (in millions of dollars)‡	$28,138	$27,038	$27,219	$27,133
	Department Store Sales (changes from like wk. a yr. ago)‡	11%	+9%	+18%	0%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$17,546	$15,567	$17,202	$14,324
	Federal Gross Debt (billions)	$255.0	$254.9	$255.7	$255.6
	Bond Volume, NYSE (millions)	$15.7	$13.6	$20.1	$20.3
	Stocks Sales, NYSE (thousands of shares)	7,482	7,179	8,567	8,110
	Loans and Investments (billions)†	$70.2	$70.4	$69.5	$66.6
	United States Gov't. Obligations Held (millions)†	$30,886	$31,198	$30,791	$36,118
	†Member banks, Federal Reserve System.				
PRICES	STEEL'S Weighted Finished Steel Price Index††	171.92	171.92	171.92	156.13
	STEEL'S Nonferrous Metal Price Index‡	246.7	242.8	248.4	157.8
	All Commodities†	183.3	183.9	183.5	152.5
	Metals and Metal Products†	189.8	189.3	190.7	168.5
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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*Week Ended Apr. 7

tion to serve both defense and civilian needs; and 2. the increasing usage of electricity in homes and on farms.

Coal Output Up, Stocks Down . . .

To provide fuel for industry, bituminous coal producers increased their output slightly in the week ended Mar. 31 to 10,135,000 net tons. Production in the preceding week was 10,120,000 tons.

Output of bituminous coal in the first quarter of this year totaled approximately 135,005,000 net tons, compared with 97,485,000 tons in the corresponding period of last year, the National Coal Association reports.

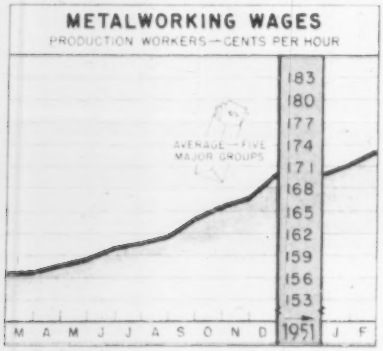
Coal production is on approximately the same level with that of the war years but it is far from the industry's maximum potential, the Bituminous Coal Institute points out. The bituminous coal companies produced 630 million tons in 1947 and can do so again if necessary, the institute says.

Above-ground stocks of bituminous coal, which on Feb. 1 had risen to the highest level since mid-1949, declined by Mar. 1 to levels approximating those of Nov. 1. Stocks on Mar. 1 totaled 70,705,000 net tons, a 4.5 per cent decline from the Feb. 1 level of 74,006,000 tons, says the U. S. Bureau of Mines. The declines were recorded in all classes of consumers.

Industrial Buildings Are Tops . . .

New contracts awarded in the week ended Apr. 5 for heavy engineering construction fell 26 per cent below the average week to date this year but industrial buildings continued to top other classes of construction. Of the $236.8 million worth of heavy construction awards that week $82.1 million represented industrial buildings, says *Engineering News-Record*.

The rise in construction costs that

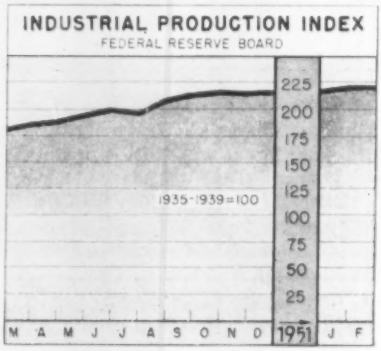


Metalworking Hourly Wages
(cents)

Production Workers—Five Major Groups

	Prim.	Fab.	Mach-	Elec.	Trans.
1950	Mtls.	Prod.	inery	Mchy.	Equip.
Feb.	160.3	148.1	155.2	144.2	167.7
Mar.	160.4	148.0	156.0	144.3	167.8
Apr.	160.9	148.8	156.9	144.6	170.6
May	161.9	149.6	157.6	145.3	169.8
June	163.0	151.5	158.3	145.1	172.7
July	164.5	152.2	159.5	146.4	172.8
Aug.	163.9	153.9	160 7	146.7	173.5
Sept.	166.9	156.1	16 8	148.5	177.0
Oct.	166.6	157.6	165.5	152.3	178.1
Nov.	168.4	158.7	167.6	153.8	179.0
Dec.	176.4	161.7	169.9	155.5	180.7
1951					
Jan.	178.9	162 4	171.3	155.5	179.4
Feb.	178.0	165.0	172.5	156.5	184.3

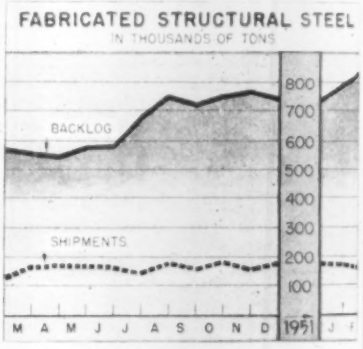
U. S. Bureau of Labor Statistics



Industrial Production Index

	Total Production		Iron, Steel		Non-ferrous	
	1951	1950	1951	1950	1951	1950
Jan.	221	183	254	203	234	180
Feb.	221	180	251	201	234	190
Mar.		187		205		200
Apr.		190		222		198
May		195		226		197
June		199		231		207
July		196		228		202
Aug.		209		236		212
Sept.		211		245		216
Oct.		216		253		223
Nov.		214		247		227
Dec.		217		253		227
Avg.		200		229		207

Federal Reserve Board



Fabricated Structural Steel
Thousands of Net Tons

	Shipments		Backlog	
	1951	1950	1951	1950
Jan.	176.9	135.2	788	565
Feb.	154.8	129.6	830	565
Mar.		156.8		556
Apr.		164.4		540
May		168.1		578
June		172.1		580
July		141.6		684
Aug.		180.7		741
Sept.		157.0		716
Oct.		183.3		747
Nov.		167.1		763
Dec.		175.6		736
Total		1,931.5		

American Institute of Steel Construction

Charts—Copyright 1951, STEEL

has accompanied the uptrend in construction pushed the Aberthaw Co.'s index of industrial construction costs for the quarter ended Mar. 31 from 338.6 per cent to 356.7 per cent of the 1914 average.

Freight Car Output Rolling . . .

Effect of the defense program to boost production of railroad freight cars is apparent in March deliveries of them.

Delivered that month were 7011 new cars, a larger number than in any of the months of 1950 or the first two months of 1951. February deliveries totaled 5842 cars.

New orders for 11,271 cars in March were not as high as in February but the backlog of orders rose by Apr. 1 to an alltime high of 158,619 cars, the American Railway Car Institute reports.

Help Wanted—and Found . . .

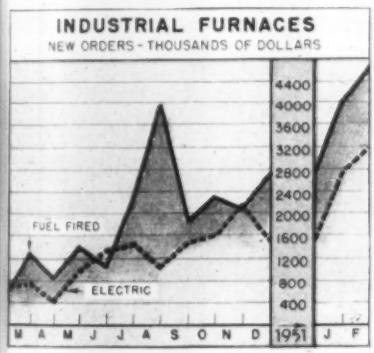
Employment swung sharply upward in March as a result of expanding defense and seasonal activity, the U. S. Census Bureau points out. Estimated at 60,179,000 in the week ended Mar. 10, civilian employment was 1.25 million above the February level. Unemployment dropped by 300,000 between February and March and reached the lowest March level in four years. Jobless were 2,147,000 people.

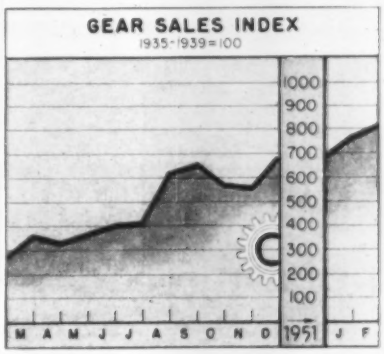
Trends Fore and Aft . . .

After holding two weeks at an alltime high, the government's wholesale price index declined 0.3 per cent in the week ended Apr. 3 to 183.3 per cent of the 1926 average . . . Here's evidence that goods for sale are piling up in businessmen's stores and warehouses: Inventories on Mar. 1 were valued at $65.1 billion, up $1.1 billion over Feb. 1. Somewhat more than half of this increase was due to higher valuation; the rest is increase in physical volume . . . Manufacturers' shipments of porcelain enameled steel plumbing fixtures during the fourth quarter of 1950 were valued at approximately $18.5 million, a slight increase over the third quarter.

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Construction	Mar.12	Ironers	Mar.26	Ranges, Gas	Mar.5
Durable Goods	Apr.2	Machine Tools	Apr.2	Refrigerators	Apr.9
Employ., Metalwkg.	Apr.2	Malleable Cast.	Mar.12	Steel Castings	Feb.26
Employ., Steel	Apr.9	Price Indexes	Apr.2	Steel Forgings	Feb.26
Foundry Equip.	Mar.5	Pumps, New Orders	Apr.9	Steel Shipments	Mar.5
Freight Cars	Feb.26	Purchasing Power	Mar.26	Vacuum Cleaners	Mar.26
Furnaces, W. Air	Apr.9	Radio, TV	Feb.26	Washers	Mar.26
Gray Iron Castings	Mar.5	Ranges, Elec.	Apr.9	Water Heaters	Mar.26





Industrial Furnaces
New Orders—Thousands of Dollars

	Fuel Fired*		Electric	
	1951	1950	1951	1950
Jan.	4,033	1,914	2,764	473
Feb	4,670	616	3,212	697
Mar.	....	1,300	....	753
Apr.	....	837	....	415
May	....	1,392	....	982
June	....	1,166	....	1,328
July	....	2,247	....	1,445
Aug.	....	3,927	....	1,039
Sept.	....	1,817	....	1,485
Oct.	....	2,306	....	1,603
Nov.	....	2,068	....	2,187
Dec.	....	2,749	....	1,505

* Except for hot rolling steel.
Industrial Furnace Mfrs. Assn.

Gear Sales Index
1935—1939=100

	1951	1950	1949
January	764.6	280.2	320.7
February	809.1	272.9	282.3
March	....	358.4	299.1
April	....	328.6	339.0
May	....	363.1	250.1
June	....	401.0	227.8
July	....	410.7	193.1
August	....	617.4	262.0
September	....	654.5	224.9
October	....	564.8	242.3
November	....	554.9	230.7
December	....	680.4	242.8

American Gear Mfrs. Association

When is the best time to Raise Capital?

Foresight in anticipating capital requirements pays off handsomely. Raise new capital when earnings and prospects are good, financial markets favorable, and well before necessity forces the issue.

We have had many years of experience in prescribing the kinds of new capital for the expansion of business, and for 40 years have demonstrated our ability to procure such capital on the proper terms.

A discussion with us incurs no obligation of any kind and may lead to a solution of your financing problems. We shall be glad to refer you to corporations well known to you, which we have served in this way.

Fulton, Reid & Co.

Originators, Underwriters and Distributors of Corporate and Municipal Securities

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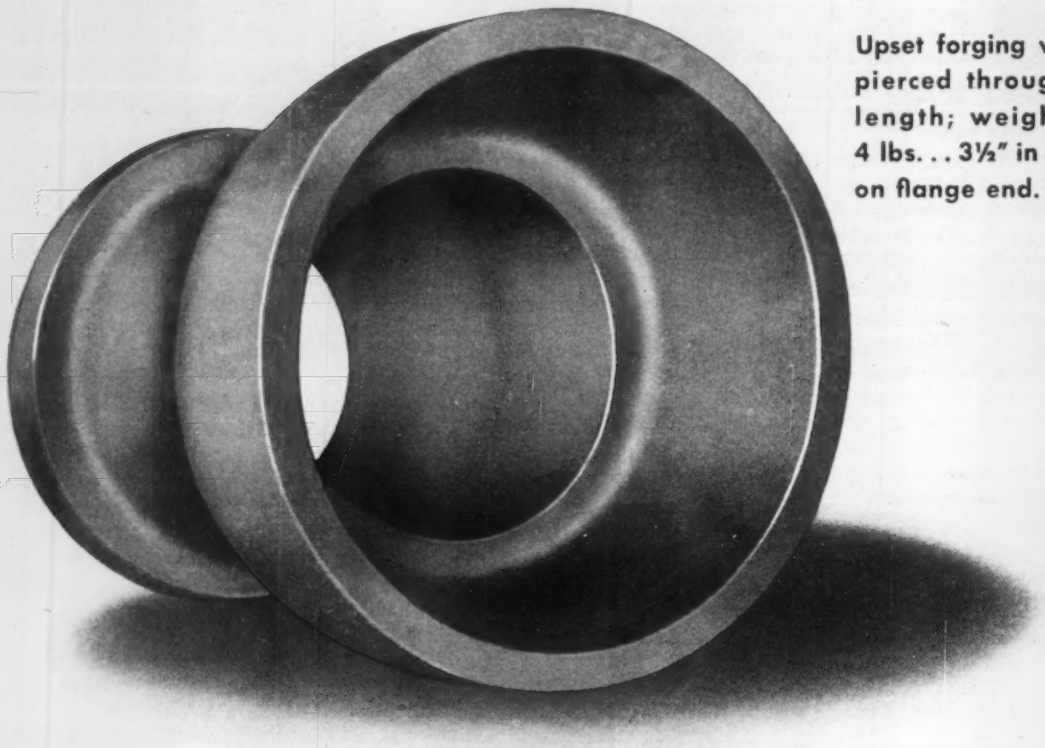
Members Midwest Stock Exchange

TRANSUE FORGINGS

USUALLY COST LESS AT THE POINT OF ASSEMBLY



Upset forging with hole pierced through entire length; weighs about 4 lbs. . . 3½" in diameter on flange end.

Consult our engineers when you are contemplating conversion to forgings or when you are in need of reliable forging service.

TRANSUE & WILLIAMS

STEEL FORGING CORPORATION · ALLIANCE, OHIO

SALES OFFICES: NEW YORK · PHILADELPHIA · CHICAGO · INDIANAPOLIS · DETROIT · CLEVELAND

OVER 50 YEARS OF FORGING PRODUCTION EXPERIENCE

Men of Industry

GAETAN M. ZUCCO
Bethlehem Pacific appointment

JOHN T. LANCASTER
works mgr. at Conner Tool

JOHN H. DAUM
joins Harrington-Wilson-Brown

Bethlehem Pacific Coast Steel Corp. appointed **Gaetan M. Zucco** contracting manager for the Los Angeles district, fabricated steel construction division. He succeeds the late **Alfred Neuffer.** Mr. Zucco has been with Bethlehem in the Northwest continuously since 1927, except for service with the Army Engineer Corps during the war. He has been acting contracting manager for this district.

Timken Roller Bearing Co., Canton, O., appointed **Paul Reeves** director of sales. He has been advertising manager since 1943 and is succeeded by **Seward T. Salvage,** formerly sales promotion manager. **Norman H. Peterson** becomes assistant advertising manager.

Robert T. Eakin, metallurgical engineer who joined **Allegheny Ludlum Steel Corp.** as a student trainee in 1940, was appointed manager of the company's Brackenridge, Pa., plant succeeding **George Evans,** who becomes special consultant to the vice president in charge of operations. Mr. Eakin, who became manager of the Ferndale, Detroit, plant in 1944, was transferred to the Brackenridge plant in 1950, and shortly thereafter was named assistant plant manager.

Dalmo Victor Co., San Carlos, Calif., appointed **A. H. Anderson** plant engineer and **P. J. Sampson,** purchasing agent.

Robert C. Tierney, formerly coordinator in the vertical turbine pump division of **Worthington Pump & Machinery Corp.,** Harrison, N. J., will be in charge of the corporation's new vertical turbine pump plant now under construction at Succasunna, N. J.

John T. Lancaster has joined **Conner Tool & Cutter Co.,** Detroit, as works manager. Prior to joining Conner he was mechanical superintendent for Richards-Wilcox Canadian Co. Ltd.

Edwin R. Jung, former general sales manager, **Clark Controller Co.,** Cleveland, was elected vice president in charge of sales.

William P. Neal, formerly with Jones & Laughlin Steel Corp., and Mercantile Metal & Ore Co., New York, was appointed manager of the steel department of **Kaunity & O'Brien Inc.,** New York. The company specializes in importation of European and Japanese steel and exportation of secondary and primary steel products.

Robert G. Millar was elected president of **Kelley-Koett Mfg. Co.,** Cincinnati. He previously was vice president and general manager of **Tracerlab Inc.** which recently purchased a majority interest in Kelley-Koett. Mr. Millar will be located in Cincinnati but continues as a vice president of Tracerlab. **Sidney S. Minault,** formerly production manager, was made vice president and general manager of Tracerlab. Also elected a vice president is **William A. Kerr,** who is general sales manager.

Robert J. Anderson, Edward E. Cazel and **George R. Goetz** were appointed sales-and-service engineers for **Brooks Chemicals Inc.,** Cleveland.

Gordon D. Zuck was elected vice president in charge of sales of **Inland Steel Container Co.,** subsidiary, Inland Steel Co., Chicago. He has been general sales manager.

John H. Daum has joined **Harrington-Wilson-Brown Co.,** New York, machine tool distributor, as a general partner and sales manager. He formerly was executive vice president and general manager of Cincinnati Planer Co. which was purchased in 1948 by Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. He then went to Wisconsin as vice president in charge of sales when Giddings & Lewis moved the Cincinnati Planer Co. operation to Fond du Lac.

Max R. Dodson was promoted to assistant controller, **Lone Star Steel Co.,** Dallas. **Carl H. Kreutziger** joined Lone Star as project manager of its new steel mill expansion program.

W. H. DeBruin, formerly in the farm tire development at Akron for **Goodyear Tire & Rubber Co.,** was appointed resident contract engineer in Detroit. He is replaced at Akron by **T. J. Thaden,** associated for the last three years with tractor tire design.

Eric N. Dittig was elected vice president assigned to the Pittsburgh office of **Luria Steel & Trading Corp. William A. Hibler** was appointed Pittsburgh district manager. He formerly was purchasing agent, Pittsburgh Steel Co.

H. H. Pease, president of **New Britain Machine Co.,** New Britain, Conn., has resigned that position but continues as chairman of the board, a position he has held since 1930. **Robert T. Frisbie,** first vice president, was elected president. **Ralph S. Howe,** vice president, was elected executive vice president; **Julian C. Pease,** secretary, was elected a vice president and a direc-

tor; and **William J. Lofgren,** treasurer, was elected secretary and treasurer.

Edgar A. Berry was elected vice president in charge of procurement, **Farm Tools Inc.,** Mansfield, O. **John S. Jones** was promoted to sales manager. He has been acting sales manager since 1950.

Marman Products Co. Inc., Inglewood, Calif., named **Robert Monroe** director of materials. He succeeds **E. W. Roche,** retired.

David L. Matthews was appointed plant manager, Avon Lake, O., general chemicals plant, **B. F. Goodrich Chemical Co.**

Athey Products Co., Chicago, elected **George A. Anderson,** formerly assistant secretary and treasurer, as vice president and treasurer, and **Robert S. Hinds,** controller, to the additional post of assistant secretary.

Federal Products Corp., Providence, R. I., elected **Fred C. Tanner** president to succeed **L. C. Tingley,** now chairman of the board. New vice presidencies were created with election of **Herbert F. Joslin** as vice president-manufacturing, and **Thomas L. Johnson Jr.** as vice president-research and development.

Ruth Huston was elected a director of **Lukens Steel Co.,** Coatesville, Pa., to succeed her father, the late **Charles Lukens Huston.**

Lamson Corp., Syracuse, N. Y., appointed **J. B. Ellor** market research manager. He was with W. C. Ritchie & Co. where he set up the market research department and served as its manager.

Birger Engstrom was elected president of **McDowell Mfg. Co.,** Pittsburgh, to succeed **W. R. Schuchman,** who becomes chairman of the board. Mr. Engstrom was vice president and general manager. **J. E. Roth** was elected vice president and is succeeded as treasurer by **A. F. Reetz. J. M. Danner** continues as secretary.

Frederick A. Deddarar was named coke plant division superintendent, Clairton, Pa., works, **United States Steel Co.,** to succeed **James McIntosh,** appointed division superintendent of U. S. Steel's coke plants at Gary, Ind., and Joliet, Ill. Changes at the Gary works also include appointment of **L. F. Burress** and **Ray D. Dwyer** as assistants to the general superintendent of the plant, and **Edgar B. Speer** as assistant division superintendent, open-hearth department. **Patterson S. Weaver** was appointed assistant general superintendent, South Chicago works.

Clarence H. Smith, superintendent, body division, **Studebaker Corp.,** South Bend, Ind., was appointed manager of its Chicago aviation plant.

Martin Kelly, for the last three years director of industrial relations, Muskegon, Mich., plants, **Continental Motors Corp.,** was elected a vice president.

Eriez Mfg. Co., Erie, Pa., announces the following organizational changes: **Earl C. Miller** was made executive assistant to the president; **M. L. Cramer,** sales engineer; **Emerson J. Tenpas,** development engineer; and **W. L. Lukowski,** design engineer.

Kaiser Aluminum & Chemical Corp., Oakland, Calif., named **Marvin L. Lee** manager of operations at its recently leased Halethorpe, Md., aluminum extrusion plant. Mr. Lee was production superintendent at Kaiser's Trentwood rolling mill near Spokane, Wash., and has been with the company approximately five years in various capacities at Trentwood and Oakland. He previously was with Aluminum Co. of America.

V. H. Peterson, manager, railroad division, **Fairbanks, Morse & Co.,** Chicago, was elected vice president in charge of railroad sales. He joined the company in 1946.

Albert S. Puelicher was appointed a director of **Giddings & Lewis Machine Tool Co.,** Fond du Lac, Wis., to fill the unexpired term of **John H. Daum,** resigned.

Loftus Engineering Corp., Pittsburgh, appointed **Charles T. McClelland** advertising and public relations manager.

Changes at the Los Angeles plant of **B. F. Goodrich Co.** include: **A. A. Villard** to succeed **R. R. Wilson,** resigned, as time study manager; **Don Hubbard** named personnel assistant succeeding **Lee H. Springer,** on leave of absence; and **Dr. Packard Thurber Jr.** to replace **Dr. J. W. Shilling,** resigned.

Kenneth A. Tamms has joined the staff of abrasive and diamond wheel department, **Manhattan Rubber Division,** Raybestos-Manhattan Inc., as sales engineer for Wisconsin. His headquarters will be in Milwaukee where he succeeds **Alex Watchorn** who will retire May 1. Mr. Tamms has been assistant purchasing agent for Ampco Metal Inc.

M. F. Macaulay was promoted to general factory manager, **Packard Motor Car Co.,** Detroit, with supervision over three manufacturing divisions—automobile, marine-diesel and aircraft jet engine. **G. K. Peets** was named factory manager, aircraft jet engine production, and **George W.**

BIRGER ENGSTROM
. . . president of McDowell Mfg.

MARVIN L. LEE
. . . mgr. at Kaiser's Halethorpe plant

M. F. MACAULAY
. . . Packards gen. factory manager

GORDON MURPHY
heads Foote Bros. division

G. T. NEUDECK
. . . V. L. Graf Co. gen. sales mgr.

THOMAS C. BEATTIE
. . . Fairless Works gen. supt.

Deislinger, factory manager, car and marine-diesel engine manufacturing.

Foote Bros. Gear & Machine Corp., Chicago, appointed **Gordon Murphy** as vice president in charge of manufacturing, precision gear division. After association with Fairbanks, Morse & Co. in its Beloit plant, Mr. Murphy joined Foote Bros. in 1947 as manager of manufacturing for the precision gear division. In his new capacity as vice president he will be in charge of all phases of manufacturing in that division.

McCulloch Motors Corp., Inglewood, Calif., named **Russell E. Gage** general manager of its new helicopter division. He was vice president and general manager, Globe Aircraft Corp.

Hays Corp., Michigan City, Ind., appointed **Orval M. Riggs** manager, application engineering. Mr. Riggs was chief project engineer in its sales department.

Harold Manderscheid has joined the sales force of **Manderscheid Co.,** Chicago.

G. T. Neudeck was appointed general sales manager of **V. L. Graf Co.,** Romeo, Mich. He was previously sales engineer, aeroproducts division, General Motors Corp., at Dayton, O.

J. F. Smith, manager of the Philadelphia branch of **Whitehead Metal Products Inc.,** was elected a vice president. **R. W. Nuffort** is now Philadelphia branch manager.

Frank W. Hoetzlein was appointed manager of **J. A. Williams Co.'s** newly created industrial supply division with offices at the company's headquarters, Pittsburgh.

L. F. Desmond was appointed director of advertising and merchandising, **Dodge Division,** Chrysler Corp., Detroit.

William C. Miller was appointed plant manager, Plant 4, Richard Bros. Division, **Allied Products Corp.,** Hillside, Mich. Replacing Mr. Miller as a sales engineer at the division is **John Hall,** formerly shop foreman.

Thomas C. Beattie was appointed general superintendent, **Fairless Works,** National Tube Co., U. S. Steel Corp. subsidiary. He will manage all operations of the new pipe mills which are being installed by National Tube near Morrisville, Pa.

Arthur T. Bennett, former vice president and manager of Baltimore operations for Mathieson Chemical Corp., has joined **H. K. Ferguson Co.,** Cleveland. He will manage operations in Colombia where Ferguson is constructing a plant for Instituto de Fomento Industrial.

Chevrolet Motor Division, General Motors Corp., Detroit, appointed **William F. Mosher Jr.** plant manager at Chevrolet-St. Louis assembly plant to succeed **Charles F. Ward,** retired. **W. G. Wilson,** plant manager, Chevrolet-Atlanta assembly, succeeds Mr. Mosher as plant manager, Chevrolet-Kansas City assembly. **J. D. Rhoades** was named plant manager of the newly activated Chevrolet-St. Louis shell division.

OBITUARIES . . .

William A. Rose, 70, retired president and director of **Bassick Co.,** Bridgeport, Conn., subsidiary of Stewart-Warner Corp., died Apr. 1.

Harry H. Lumley, retired Chicago executive, **American Steel & Wire Co.,** Cleveland subsidiary, U. S. Steel Corp., died at his home in Coral Gables, Fla., where he had resided since May, 1950.

Henry R. Hughes, 45, co-owner of **Hoff Screw Products Co.,** Detroit, died Apr. 4.

Frank J. Saile, 49, founder of **Wayne Die & Tool Corp.** and its division, Cadillac Tool & Die Co., Detroit, died Apr. 2.

Carl W. Urban, 43, former chief tool engineer, **Ford Motor Co.,** Dearborn, Mich., died Apr. 2. Since 1949 he was chief tool engineer at the Ford aircraft plant in Chicago.

Raymond L. Caldwell, 60, head of **Ray Caldwell Co.,** Syracuse, N. Y., brass foundry, died of a heart attack Mar. 31.

Elliott D. Harrington, 54, head of mobilization activities of the small and medium motor divisions, **General Electric Co.,** Schenectady, N. Y., died of a heart attack Apr. 1.

George G. Adams, 49, New England sales engineer, machine division, **Osborn Mfg. Co.,** Cleveland, died at his home in Ridgewood, N. J., Mar. 31.

Frank O. Scherr, former owner, **Syracuse Gauge Mfg. Corp.,** Syracuse, N. Y., died Mar. 29. He retired in 1948.

Dean J. Case, 67, president, **Kinfolks Inc.,** Little Valley, N. Y., died Apr. 3. He started the cutlery manufacturing firm 23 years ago.

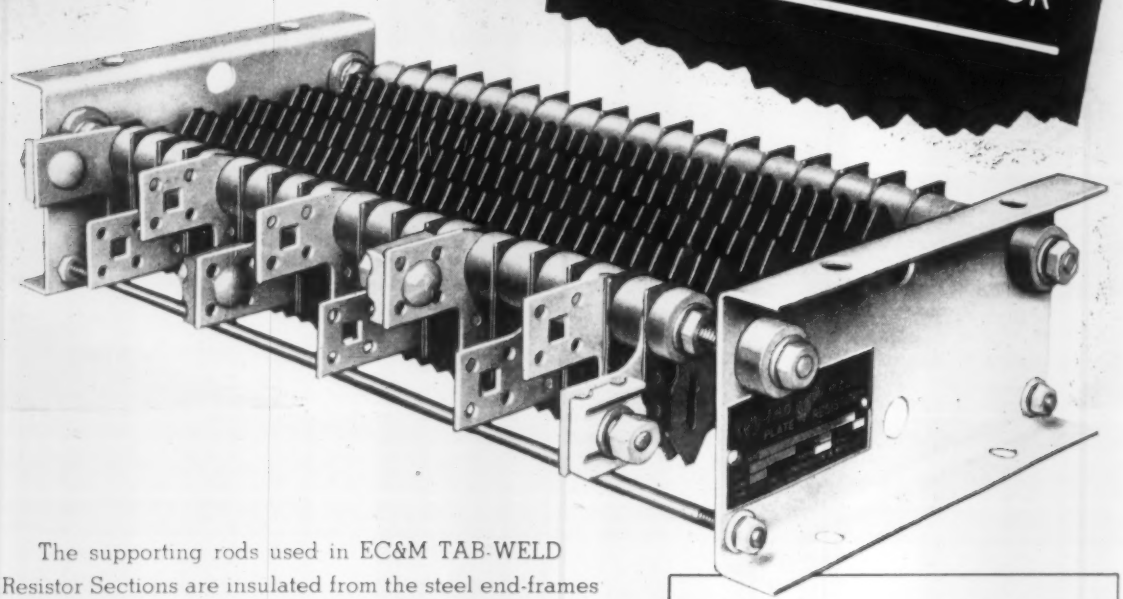
F. R. Hight, Atwater plant manager, Detroit, **Budd Co.,** died of a heart attack Mar. 29.

Double Insulation To Ground

TRADE MARK

TAB-WELD PLATE RESISTOR

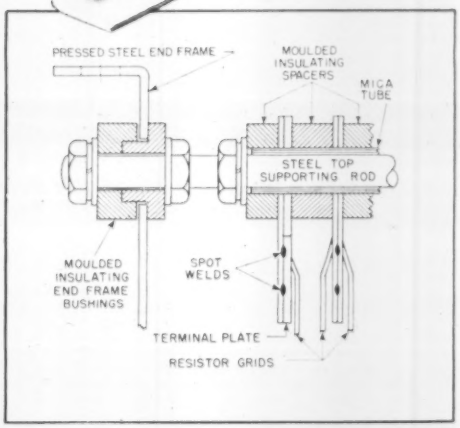
PATENT NO. 2,378,038



The supporting rods used in EC&M TAB-WELD Resistor Sections are insulated from the steel end-frames by interlocking moulded bushings. Mica tubes are placed over the supporting rods to insulate the individual grids.

The assembled grid-stack is clamped by nuts located on the supporting rods *inside* the end-frames, making it possible to maintain *accurate mounting-hole* dimensions. End-frames are independently clamped.

In low-ampere-capacity sections, requiring a center supporting rod, interlocking spacers insulate and hold the grids firmly These spacers have high heat-resisting properties.



OTHER IMPORTANT FEATURES WORTH REMEMBERING

1. Corrosion-resistant alloy steel.
2. Negligible resistance change.
3. Same height, width, length.
4. Same size grid throughout.
5. Convenient tap-shifting.
6. Non-breakable.

specify **EC&M Bulletin 942 *TAB-WELD* Plate Resistors**

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Production AND Engineering NEWS AT A GLANCE

ONLY THE NAME LINGERS ON—The old days of free lunch, music while you work and chummy talks over the PA system by the boss to his "associates" are no more at Jack & Heintz plants. The new management, with a comfortable package of Air Force contracts under its belt, is looking to a profitable future in the manufacture of such things as motors, generators, actuators, inverters and electrical control systems. "Rotomotive" equipment is the name coined for the devices by the company's advertising agency, Fuller, Smith & Ross, whose Mr. Ed Martin gets the cigars. J&H is now making over 400 different models of electrical, hydraulic or mechanical rotomotive equipment, some comprising more than 1000 individual parts. A few of these components are pretty complex, involving maybe 30 or 40 operations.

. . . Rotomotive?

BENCH-TOP WELDER—Spot welding of very light gage metals and wire for parts such as vacuum tube grid and plate elements is handled efficiently by a compact little welder built into a case only 4½x8x11 inches in size. Using standard 110-volt ac, the device is built in four models with two, three or variable heat ranges, either factory preset or adjustable pressure, and weighing 13 pounds in the pushbutton type, 26 pounds in the foot pedal design. Welding time is closely controlled at about 0.001-second which means that the sharp-pointed electrodes never even become warm.

SWITCH TO SAVE—Copper conservation measures worked out by Bell Telephone Laboratories point to annual savings of 5000 tons of the red metal, used by the Bell system at a rate of 86,000 tons a year. They include more copper-clad steel wire for solid copper and reducing the gage of some wire in subscriber cable from 22 to 24. Bell engineers have gone right down the line in devising substitutes and alternates for other critical materials. For example, cobalt for permanent magnets in meters and receiver instruments has been replaced by an alloy of 5 per cent chromium, 21 molybdenum and the balance iron.

ANOTHER TITANIUM SOURCE—A third mill-fabricator tieup in the titanium field appears to finalize the shape of the competitive picture there, at least for the next few years. First came the wedding of National Lead and Allegheny Ludlum to beget Titanium Alloys Mfg. Co.; then Remington Arms and Crucible Steel to spawn Rem-Cru Titanium, and finally P. R. Mallory plus Sharon Steel to introduce Mallory-Sharon Titanium. It is not clear yet whether the latter will move into the sponge production field or not. The plan may be to continue buying sponge from DuPont and concentrate on melting and alloying proprietary analyses.

FLOATING ON AIR—You will be hearing more about "air bearings" and "air-jet lubrication" as current studies of the concept mature. Both high-speed rotating spindles, running up to 150,000 rpm, and flat sliding members have been fitted with air bearings, an air film only 0.001-inch thick fed into the bearing races through small tubes 0.003-inch in diameter. Starting friction is eliminated and, in the case of sliding members for example, a 7½-ton block of steel can be supported by an air film and easily moved.

STAMINA IN THE AIR—Today's airframe travels at 5-6 miles a minute for nonstop distances of 1800 miles or more, supports engines and accessories equal to 1.2 times its own weight, carries fuel and payload equal to 1.7 times its weight. All this places more exacting demands on structural materials—aluminum, magnesium and steel. Three relatively new precipitation-hardening stainless steels provide ultimate strengths in the 200,000 psi range and are being given robust welcomes by airframe designers. —p. 77

PREPAINT TREATMENT—On the market for about four months is a new surface etching and phosphatizing treatment, applicable to iron, steel and aluminum and known as Poly-Kote. Parts may be dipped in the liquid, sprayed or wiped, and 1 gallon will treat 5000 sq ft of surface, producing a fine crystalline film which is controllable in the range of 50-500 milligrams per sq ft.

REVERSE PRODUCTIVITY—Estimates indicate a passenger automobile represents 3 pounds of car for one hour of wages. In World War II a combat tank figured to 1 pound per hour of wages, and right now that is down to about ½-pound per wage hour. Earl Smith, Republic Steel chief metallurgist, calls it "very doubtful" whether, once a shift is made to war production, we have either the manpower or the will to work long enough to consume the materials available.

—A.H.A.

Metalworking Outlook—p. 35 Market Outlook—p. 127

ORDNANCE TANK-AUTOMOTIVE

. . . Realigned in Family Groups

Procurement program, now topping $3 billion, will be spread over nationwide network of primes and subs. Effective standardization of components worked out for both tactical and combat units

GEARING production facilities for turning out 35,000 combat tanks annually is a major undertaking, and one of the principal elements of the present defense effort. It involves thousands of prime contractors, subcontractors, sub-subs, even third and fourth-tier suppliers.

Yet, measured against production records of World War II, 35,000 tanks is no great shakes. The tally shows total output of 28,765 light tanks, 56,679 mediums and 1791 heavies, not to mention 48,816 self-propelled weapons, for a grand total of 136,051.

The tank family of vehicles, which includes gun motor carriages, cargo tractors, tank destroyers, tank recovery or retriever units and armored utility tracklayers such as personnel carriers, is essentially of an automotive nature which is why the principal technical, production and procurement information center of the Department of Defense for tank-automotive material is centered at the Detroit Arsenal in Center Line, Mich., built originally by Chrysler for production of medium tanks and taken over after the war by the Office, Chief of Ordnance.

The arsenal is under direction of Brig. Gen. D. J. Crawford, commanding officer of Ordnance's Tank-Automotive Center, national procurement focal point for standard automotive major items and spare parts. It is closely linked with Aberdeen Proving Ground, Ordnance's test center for automotive equipment; with Frankford Arsenal for fire-control accessories; with Watervliet Arsenal for cannon; with Raritan Arsenal for technical publications, and with the Signal Corps Laboratory at Fort Monmouth, N. J., for communications equipment.

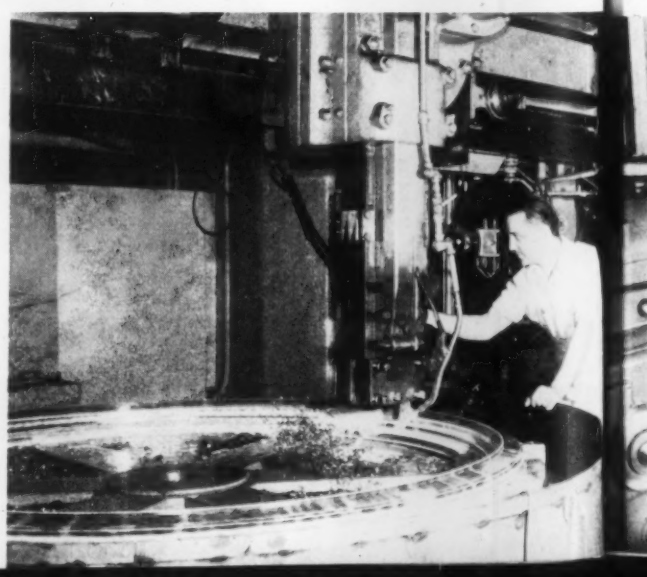
Research Pays Off—Fortunately for the country, far-sighted Ordnance Corps planning enabled development and research on tanks to continue during the postwar years, including a limited degree of production of new vehicles and reconditioning of battle-scarred hulls retrieved from the European theater. Working in co-operation with industry, engineers at the Detroit Arsenal concentrated on improving designs to facilitate mass production, increase ease of supply and maintenance, and to conserve critical materials, manufacturing facilities and manpower.

Prototypes of mobile ordnance with which the last war was fought were completed as far back as 1942 and it soon became apparent, although too late for production, that a complete reworking of design features, including all major components, was a "must" if maximum efficiency, both in manufacture and in the field, was to be obtained. Available funds had been too small to achieve this goal before the war. U. S. tanks in the last war were regarded by many as amateurish alongside German, Russian and even British counterparts. They were too slow, too difficult to maneuver, too weak in firepower, too high in silhouette, too easy targets for the enemy.

They were progressively modified and improved but this was largely a makeshift program. There was little standardization to facilitate field service. Some had radial aircraft-type engines, some V-8 automotive engines, some even a weird grafting together of five automotive engines in a single unit. Transmissions were of several types, guns were changing all the time, fire-control devices were hodge-podge.

Heavies Became Mediums—So after a comprehensive program of study and basic research, a "family theme" was developed for all major tank-automotive components—engines, transmissions, armament, fire control, suspensions, hydraulic and electrical accessories. Results of the effort have been available in the form of pilot models only in the last two or three years. One, the General Patton M-46, originally a heavy tank but now classed as medium and scaling

Machining the correct profile in this 80-inch diameter turret ring ball race is speeded by use of a duplicator attachment on the large boring mill



VEHICLES

Bred in the spacious shops of the Ordnance Tank-Automotive Center's Detroit Arsenal in the years since World War II, better than $3 billion worth of production orders for combat and tactical vehicles now are being fanned out over the U. S.

By A. H. ALLEN
Associate Editor, STEEL

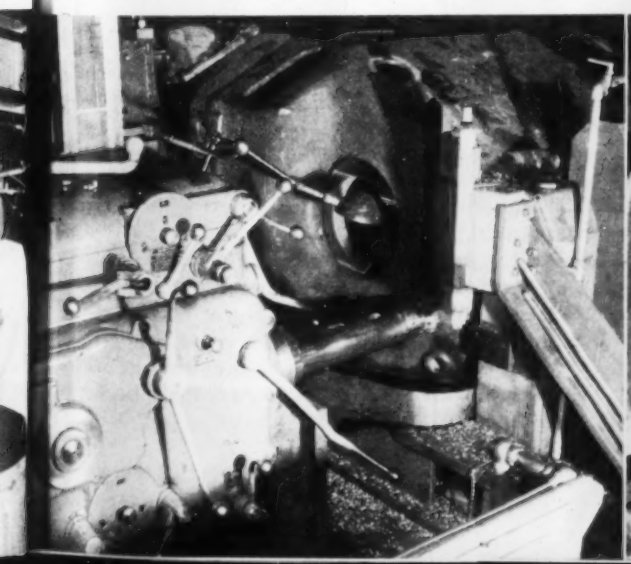
Prototype of this M41 gun motor carriage mounting a 155-mm howitzer was built well over four years ago and is now being released for production

about 45 tons, was far enough along so that production of a few units could be started in 1949 at the Detroit Arsenal. By the time of the Korean outbreak the M-46 was available in sufficient number so that shipments could be made to field forces, and it consistently outperformed the M26 General Pershing medium tank which saw early service in Korea.

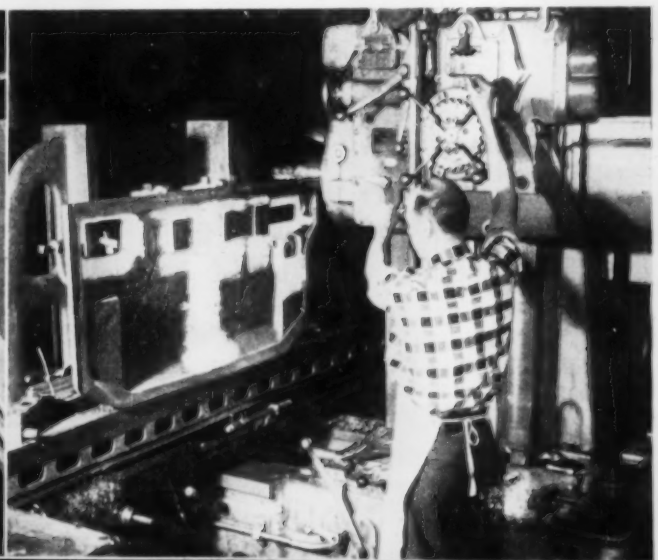
The M-46 mounts a 90-millimeter high-velocity gun. Several months ago the tank arsenal began tearing down two assembly lines to accommodate a modified version of the General Patton, known as the M-47 and carrying an improved gun. This design is now in production and may see early action.

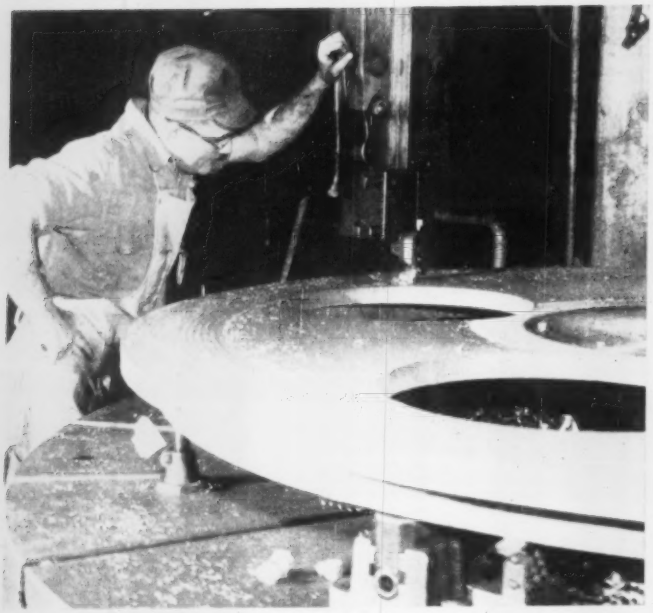
The job of rebuilding and refitting veteran tanks

Trend to single-piece cast hulls requires that machines be brought to the part instead of vice versa. This horizontal boring mill works on side openings

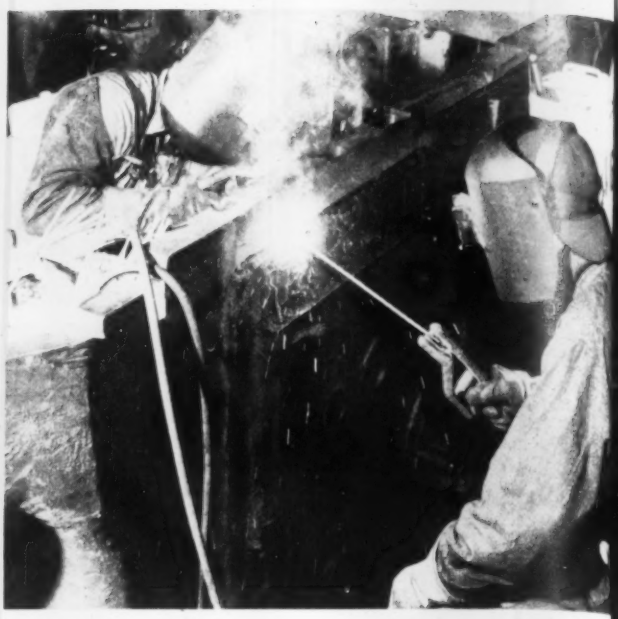


Edge milling this small section of cast armor for a tank hull calls for heavy machine equipment and rigid mounting of the thick plate on the moving table





Boring mills by the dozen are essential in machining heavy tank components. This setup is one at the Detroit Arsenal, where a thick mounting is surfaced



Ferritic instead of austenitic electrodes have been developed for improved welding of rolled armor plate sections making up the hulls of today's tanks

of World War II is nearly completed, although at last reckoning there were something like 350 still awaiting the treatment. It involves a complete teardown, lengthening of the center hull section, welding on new sections of armor plate, installing a new type of engine, new guns, fire control, etc. Several thousand have been thus outfitted.

Flexible Engine Designs—Two "families" of air-cooled heavy-duty engines were developed by Ordnance through contract with Continental Motors in the period 1942-48. One is based on a 149-cubic inch displacement cylinder built up into various combinations from a 6-cylinder horizontal-opposed 375-hp type to a supercharged V-12 rated at 1040 hp. The second engine group is based on a 67-cubic inch displacement air-cooled cylinder, assembled in ranges between 100 and 200-hp, for advanced designs of tactical trucks and cargo carriers. Both types have high interchangeability of parts, particularly those most vulnerable to damage; and they also have proved dependable for military service in extremes of climate. Units in the first family group are standard for tank installations, and facilities are being established for their manufacture by Chrysler at New Orleans. Continental Motors at Muskegon, Mich., has been until now the sole source of supply.

Standardization and interchangeability of parts also has been worked out for other components. Transmissions, for example, for both tanks and trucks make use of hydraulic torque converters, infinitely variable speed ratios, planetary gearing, hydraulically operated bands and multiple-disk clutches. They permit gear shifting under full engine torque, plus pivot steering through finger-pressure controls. With the new engine, the resulting power train contributes to operating efficiency and reduction of operator fatigue, as well as an important reduction in weight, amounting in the case of the light and medium tank installations to around 30 per cent. First supplied by Allison Division of General Motors at Indianapolis, they will later be made at Buick in Flint, Mich.

Savings in service parts and special tools are especially significant as a result of the family treatment of combat and tactical vehicle groups. In the light and medium tank units, there are 43 common components, calling for parts and tools literally by the thousands. Their standardization has meant sweeping economies in procurement, manufacturing, storage, issue, training and maintenance. And not only that; it has also contributed to the feasibility of quick air transport of these essentials to distant theaters, in the event of all-out global war.

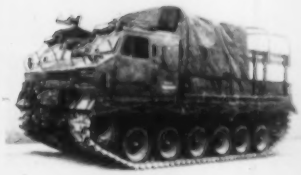
Reproduced herewith are nine vehicles (or their silhouettes in the case of "restricted" models) in the "light-medium tank group," together with a list of 66 common components. Among the vehicles is the T-41 light tank, or Walker Bulldog which is in production at Cadillac's new plant in Cleveland (STEEL, April 2, p. 51).

Two Principal Truck Models—In the re-establishment of production prototypes for tactical (wheeled) types of transport vehicles, the TAC in Detroit found it practical to modernize and adapt for military use the current commercial models of both the ¼-ton 4x4 and ¾-ton 4x4 World War II trucks. The principle followed was that of improvement by engineering transition rather than radical change. Considering the ¾-ton truck, there is something like $30 million worth of service parts, tools, catalogs, maintenance manuals, etc., distributed at the present time to depots and warehouses all over the world wherever U. S. forces are stationed. It would have been foolish to obsolete this valuable stock. A similar situation exists with respect to the ¼-ton trucks.

LIGHT-MEDIUM TANK GROUP

Carriage, Motor, 105 mm How., T98

Armored Utility Vehicle, M44E1



Tractor, Cargo, 7½ ton, M8E1

...iage, Motor, 155 mm How., T99

Tank, Light, T41E1

Tank, Medium, T42

Tractor, Cargo, 5 ton, T43E1

...r, Motor, Twin 40 mm Gun, M19A1

COMMON COMPONENTS

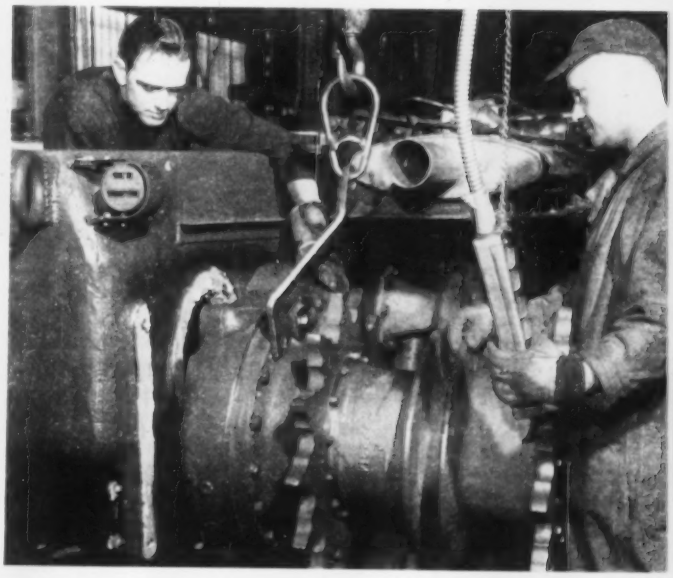
Engine	Pintle	Heater	Radio
Fuel Pump	Fan	Windshield Assy.	Water Pump
Carburetor	Injection Pump	Fan Belt	Governor
Oil Pump	Primer	Fuel Filter	Air Cleaner
Coil	Oil Filter	C. C. Vent Valve	Magneto
Starting Motor	Spark Plugs	Distributor	Regulator, Voltage
Transfer Case	Starting Motor Drive	Generator	Transmission
Final Drive	Propeller Shafts	Clutch	Oil Pump Dif.
Track Wheels	Suspension	Control Dif.	Torsion Bar
Battery	Track Support Wheels	Volute Springs	Brakes
Radiator	Aux. Generator	Hubs	Winch
Oil Pressure Gage	Bumper	Shock Absorbers	Ammeter
Tachometer	Temp. Gage	Instrument Panel	Speedometer Cable
Starter Switch	Tachometer Cable	Speedometer	Light Switch
Driving Blackout Light	Starter Relay	Ignition Switch	Head Light
Pillar Light	Marker Light	Circuit Breaker	Dome Light
		Tail Light	Horn

Vehicle, Tank Recovery, T6E1

In the case of the 2½-ton 6x6 trucks no commercial prototype having appreciable production bases was found, so a new unit was designed, with many unusual characteristics such as ability to ford deep streams. It is now being built by Reo Motors in quantity.

As more industrial facilities come into the tank-automotive picture over the next 6-12 months, the Detroit Arsenal will slowly abandon its role as the main production center for tanks. Flexibility of the plant allows assembly of as many as five different vehicles at the same time without appreciable reduction in rate, but the planning now is for a transition to the many special projects involved in any army ordnance supply program which do not fit into mass production. They usually are modifications of basic major items, like mounting flame-throwers in tank chassis, or supplying urgently needed small numbers of special-purpose combat vehicles.

"Downtown" Branch Functioning—In August, 1949, the TAC was given responsibility for national mobilization of procurement and production planning for all tactical and combat vehicles specified by all branches of the services. Personnel of 6600 at the arsenal was augmented by opening of a procurement and distribution center at 1501 Beard St., Detroit. This is a former plant of International Detrola Corp. and is often referred to as (*Please turn to Page* 98)



Final drive sprockets are swung into place on an improved type of M46 General Patton medium tank being built in volume at the Detroit Arsenal currently

Seen and Heard in

The Machinery Field

By GUY HUBBARD
Machine Tool Editor

FIFTEENTH FORUM: My impression is that last week I established some kind of a record when I attended the Westinghouse Machine Tool Electrification Forum, William Penn Hotel, Pittsburgh. My record is one of unbroken attendance over the entire 15 years that these forums have been held.

The small group of machine tool men and editors who attended the first forum at the Westinghouse plant in East Pittsburgh scarcely realized that something of such great and continuing importance had just then come into being. Neither did the Westinghouse men—at least not until the results of that meeting had been digested.

The original idea was to find out from machine tool men what their industry wanted in the way of electrical drive and control apparatus—also to acquaint those men with what then was commercially available. It took a few hours to get everybody's hair down to the point where informality reigned and the real facts of machine tool and electrical engineering began to be exposed. Then both groups began to learn things which were destined to speed up and enhance the progress of machine tool development and electrification in a truly remarkable manner.

As the years have rolled by, this uninhibited spirit of give and take has continued to prevail. That is the main reason for the success of the forums—which incidentally have come to embrace pneumatic, hydraulic and mechanical drive control, as well as electrification.

To me, these forums represent the finest demonstration that can be produced as to the ability of private enterprise to bring about inter-industry understanding and inter-industry progress. Westinghouse Electric Corp. has furnished splendid facilities for these meetings and has been more than generous in covering their very considerable cost. The company has not, however, in any way exercised domination over them.

I can't imagine any government bureau allowing any such degree of freedom. I can't imagine any government bureau getting one-tenth of the useful results that private enterprise has distilled out of these meetings. May they long continue as they are!

EVALUATING MACHINERY: My good friend J. E. Loudon, advertising manager, Cone Automatic Machine Co. Inc., Windsor, Vt., has had privately published an interesting essay entitled, "There's Room for More on the Balance Sheet."

In this essay he makes an excellent case for more interest on the part of consulting engineering, accounting and efficiency analysts in getting at the true value of machine tools and related equipment in terms of its ability to meet competition with other companies' equipment—especially that of the latest design.

Ted Loudon says: "There would be advantages from surveys that would analyze individual pieces of equipment to determine their low cost contributions to the method or process of which they are a part—as well as to determine their contributions to the total production efficiency of the finished product.

"Just as the efficiency of the equipment could vary in accordance with the method or process used, so could it vary in accordance with the particular product manufactured. In instances where the same pieces of equipment would be employed to produce a number of products for a company, a record of the differences in their efficiency ratings for the production of each could be useful in the consideration of possible additions, alterations, deletions or replacements of products as well as of equipment."

It looks to me very much as though Ted Loudon has gotten hold of something here that opens up a new field for consulting specialists who are willing to delve into machine tool engineering and economics—including the various replacement formulas which lately have been developed. I suggest that those who think they have the qualifications, get copies of Ted Loudon's essay, to determine whether or not they can fit themselves into his interesting picture of a new profession.

QUICKENED MACHINE BUILDING: In times of national emergency many of the machines most sorely needed are those which under ordinary conditions take longest to build.

Fortunately, there is a way to get around this situation—assuming the crisis is great enough and assuming that buyers of such big machines are willing to sacrifice features and frills to meet the crisis.

An example of such a case is given by a big boring mill at the Westinghouse plant in East Pittsburgh—a machine which was "hurried up" to meet vital defense needs during those dark, early days when we seemed to be losing World War II.

When this big machine was ordered, it was to be of standard design, with a cross-rail which could be raised and lowered on high supports to meet all heights of work within a wide range.

Under pressure of that crisis of the early 1940s the machine tool builders, Westinghouse production engineers and some of the best machine tool heads on the War Production Board pooled their brains and their ingenuity. As a result of this mental huddle they came up with a design which did away with all the complicated cross-rail elevating mechanism. Substituted for it was a series of cast iron boxes of various heights upon which the rail is bolted in fixed position.

The trick is simple. The rail is lifted by a pair of overhead cranes, a pair of supporting boxes to suit the height of the work in process is set in place and the rail is bolted to them. I note that this simplified machine is still doing business—helping ably to meet a new crisis a decade after that of Pearl Harbor.

Designers Look to

STRONGER AIRFRAME MATERIALS

Progress in airframe construction materials is the story of applying stronger, lighter materials for greater payloads, greater speed and longer distances between refuelings. Some of the metals: 230,000 psi chrome-moly steels, a new stronger aluminum alloy, titanium and a new magnesium alloy

By LEO SCHAPIRO
Douglas Aircraft Co. Inc
Santa Monica, Calif.

AIRFRAME requirements add up to a simple choice of construction materials. All the designers need is the strongest materials of the lowest weight. Where greater material strength is obtainable without an increase in weight, payload is thereby increased or speed is increased if the power plant is available to produce the higher speed, or nonstop distance is lengthened.

An airframe consists of a fuselage, wings, tail, nacelles and landing gear. It is constructed to fulfill three simple requirements: First, it has to be capable of getting off the ground and into the air. This in itself is not a simple matter for to fulfill this requirement the airframe must not only support its own weight but also the weight of at least one engine to move it, at least one pilot to operate the engine and guide the airframe and certainly some fuel to give the engine life.

Second, the airframe must be capable of supporting one or more engines of a size and power rating that shall give the airframe some usable rate of speed and shall be capable of carrying the weight of a reasonable quantity of fuel to carry the airframe to some reasonable distance without refueling. Third, the airframe shall be capable of carrying the additional weight of some usable payload.

How did the transport airframe of ten years ago fulfill these three requirements? That airframe carried three times its own weight at a speed of approximately 3 miles per minute for a nonstop distance of approximately 600 miles. To achieve the 3-mile per minute speed, weight of engines, instruments and accessories equaled the weight of the airframe. To achieve the 600-mile nonstop flight with a useful payload, weight of fuel and payload together equaled the weight of the airframe.

To achieve this performance, the airframe was constructed of the strongest yet lightest weight material then available. This was the aluminum alloy 24S with a strength of approximately 60,000 psi. Where structural considerations dictated the use of steel, this three-times-heavier-than-aluminum material was used at a strength of 180,000 psi to "pay its way" without a sacrifice of weight for equal load carrying capacity. This was the airframe of 10 years ago.

Today the airframe travels at 5 to 6 miles per minute for nonstop distances of 1800 miles or more. It supports engines, instruments and accessories equal to 1.2 times the weight of the airframe. It carries fuel and payload together equal to 1.7 times the weight of the airframe. It carries a total load equal to four times the weight of the airframe and at a speed almost double the speed of 10 years ago when the airframe carried a load only three times its own weight. Advances in aerodynamic smoothness were aided in this progress by the use of a material stronger than the 24S aluminum. The stronger material which has aided this progress is the 75S aluminum alloy with a strength of 70,000 psi.

The new, stronger 75S material was not as easy to form as the lower strength older material. The new material was not as easy to join together; it was not as easy to heat treat; it was not as easily designed into a part. These problems the industry gladly undertook to solve to utilize the prize of greater payload, greater nonstop distances and greater speed which this 16 per cent stronger for static loads though not stronger for fatigue loads, but no heavier, material made possible.

The steel landing gear of this airframe is not yet so efficient as the 70,000 psi strength aluminum components. To be as efficient, the steel would need to

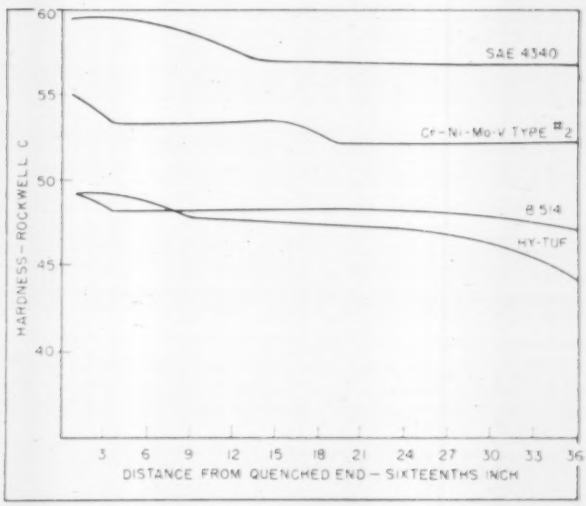


Fig. 1—End quench hardenability test results

From data presented by the author at the Western Metal Congress, Oakland, Calif., Mar. 19-23.

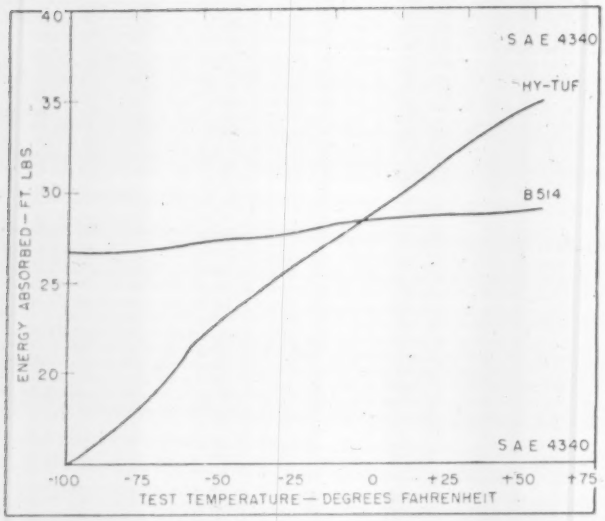


Fig. 2—V-notch Charpy impact resistance of 235,000 psi strength special steels. High and low room temperature values for SAE 4340 are for 180,000 psi and 235,000 psi strength levels respectively

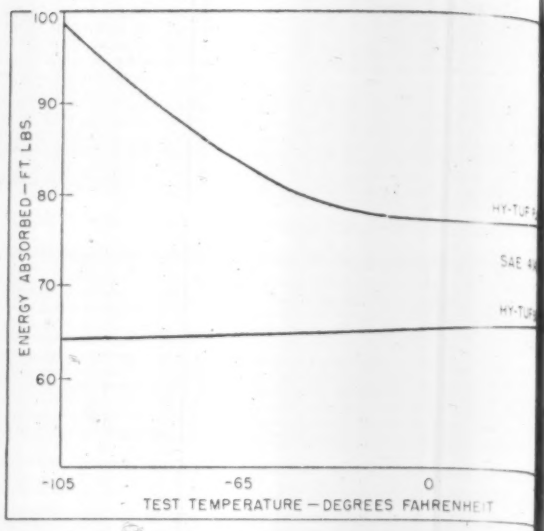


Fig. 3—Tension-impact resistance of Hy-Tuf plate and bar in comparison with 180,000 psi strength SAE 4340

be used at 210,000 psi strength. This higher strength of the chromium-molybdenum steel is coming into use, but with misgivings in the minds of many designers. The lowered ductility and impact resistance of SAE 4340 steel at strengths of 210,000 to 220,000 psi is too far a cry from the time-tested and flight-tested ductility and impact resistance of SAE 4340 steel at strengths of 180,000 to 200,000 pounds psi. Thus a requirement was born for a steel at over 210,000 psi strength with ductility and impact resistance at this strength level not less than the ductility and impact resistance of 180,000 psi strength SAE 4340 steel.

This requirement was only recently presented to the steel industry and that industry should be complimented on the speed with which the requirement was fulfilled. Three steel companies now offer a 230,000 psi strength steel whose ductility and impact resistance are not less than the values of these properties possessed by the previously used and time-tested 180,000 psi strength SAE 4340 steel.

TABLE I
REPRESENTATIVE ANALYSES OF NEW HIGH STRENGTH, HIGH-TOUGHNESS STEELS

Manufacturer	Trade Name	C	Mn	Si	Cu	Cr	Ni	Mo	Va
Crucible Steel Co.	Hy-Tuf	.25	1.35	1.50	..	..	2.00	.40	..
U. S. Steel Corp.	B-514	.25	.80	.60	.70	.70	2.30	.55	..
Republic Steel Corp.	Cr-Ni-Mo-V Type #2	.30	.90	..	..	.75	1.85	.45	.10
	SAE 4340	.40	.65	.30	..	.80	1.80	.25	..

Representative chemical analyses of these steels in comparison with SAE 4340 steel are shown in Table I. It is apparent that these steels do not readily fit themselves into the SAE numerical classification system. While the differences in alloy content may appear striking, the low carbon content is especially interesting. The low carbon content is not accidental but is a deliberate effort to improve weldability of the new material in comparison with the weldability of SAE 4340 steel. The lowered carbon content has not resulted in lowered hardenability. End-quench hardenability tests, Fig. 1, indicate little difference between the new steels and the SAE 4340 steel which they may soon replace.

Ductility values are presented in Table II to illustrate the comparison with SAE 4340 steel at 180,000 psi strength as well as with SAE 4340 steel at 230,000 psi strength. Ductility of the SAE 4340 steel at the high strength level may not appear to be too markedly lower than that of the lower strength level but this effect coupled with the lowered impact resistance was a mental hurdle to overcome if not a real one. The comparison of impact resistance is illustrated in Fig. 2 for V-notch charpy tests and in Fig. 3 for tension impact tests.

Fatigue Resistance Good—Axial-load, tension-tension fatigue tests with a ratio of minimum/maximum load of +0.25 are presented in Fig. 4 for unnotched and notched specimens. These data illustrate tha

TABLE II
DUCTILITY OF THE NEW STEELS IN COMPARISON WITH SAE 4340

Steel	Ultimate Strength (psi)	Yield Strength .2% Offset (psi)	Elongation in 1" (per cent)	Elongation in 2" (per cent)	Elongation Zero g.l. (per cent)	Reduction of Area (per cent
Hy-Tuf	235,500	196,700	23.5	14.0	98.0	49.2
B-514	228,700	184,100	14.0	...	...	54.8
Cr-Ni-Mo-V Type #2	247,500	222,000	...	12.0	...	47.8
SAE 4340	180,000	174,000	23.4	14.0	...	48.0
SAE 4340	236,500	212,000	...	10.0	54.0	35.0

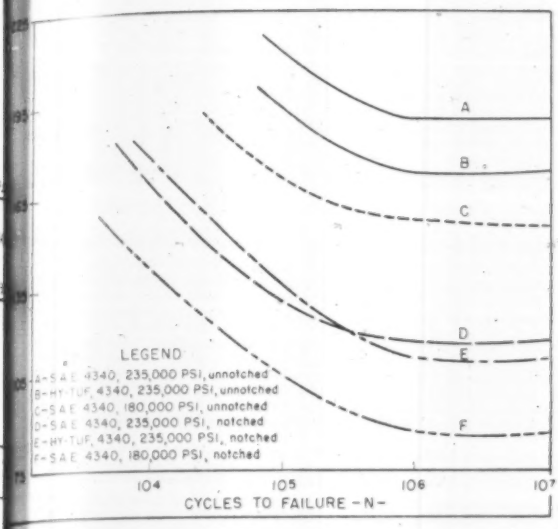


Fig. 4—Axial tension fatigue life for minimum stress 20 per cent of maximum stress

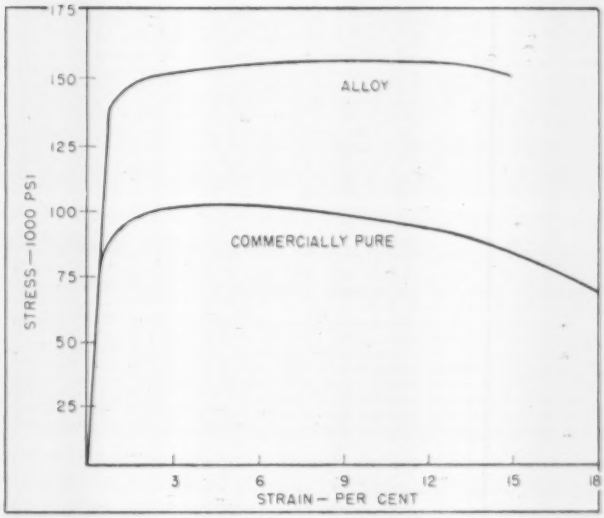


Fig. 5—Stress-strain diagram of titanium, a commercially pure and an alloy grade

notched effects are no greater for the new steels than for the old under alternating load.

While the foregoing details regarding the high strength—high toughness steels may seem to praise them highly, it is important to remember that the useful high toughness of these steels is only present at the high strength level discussed. At lower strength levels, the new steels are not different from SAE 4340 or other constructional alloy steels.

One complication faces the airframe industry in the use of this high strength steel. The complication is one of specification interpretation and will, no doubt, be resolved readily as its use expands. This concerns the tempering temperature for the new steel. To achieve the 235,000 psi strength level, Hy-Tuf steel is oil quenched from 1600° and tempered at 550°F. This tempering temperature is within the blue-brittle range if applied to SAE 4340 steel or other previously used constructional steels and is therefore not permitted by government specifications governing steel heat treatment. This temperature, however, is not within the blue-brittle range for Hy-Tuf steel and therefore results in good ductility and good impact resistance at the high stress level. No doubt the government specification governing heat treatment of steels will some day recognize the different blue-brittle range of this unique chemical analysis and will reword its section on tempering temperature.

What About Tomorrow?—Speeds in excess of 6 miles per minute may be a reality for transport airframes sooner than one dares to predict. Advances in aerodynamics may make it possible for the airframe to sustain these greater loads without the use of a stronger-yet-not-heavier structural material. The first phase of this development may occur in that manner but the second phase will likely require the use of a stronger material.

New Aluminum Alloy—To retain its supremacy in the use of aluminum as the primary airframe structural material, the aluminum industry has already produced an alloy 8 to 10 per cent stronger for static loads but not for fatigue loads than the present 75S alloy. The new alloy is not yet commercially available. Since the airframe industry is not yet ready to use it, the aluminum industry is availing itself of the opportunity to study its new alloy to determine what new problems the airframe industry may face in forming, joining and heat treating of this new material.

One consideration for the next advance was not present in the past one. As speeds exceed 6 miles per minute, aerodynamic skin friction will make the temperature of the airframe's surface something in excess of ground temperature. Depending on actual speed, skin temperature may reach 300° F and at such a temperature the strength of even the high strength aluminum alloys is not particularly useful. The next structural material may need to be one that is not only stronger than 75S on a strength weight basis but also one that has little loss of strength at aerodynamic-friction temperatures.

For 20% Increase: Titanium—Because of this possible uncertainity, we now stare wide-eyed at the much discussed "wonder metal," titanium. With a density twice that of aluminum, may it give us 20 per cent strength increase over 75S aluminum? To do this a strength of 170,000 psi is required.

The "commercially pure" metal is short of this goal by almost 100,000 psi. At its low strength, the commercially pure titanium is not uniquely useful to the airframe industry as a structural material. It is finding some use in elevated temperature regions not exceeding 800° F as a substitute for annealed stainless steel. Here, at equal strength it effects a one-third saving in weight. But the airframe industry will feel the full impact of the titanium if and when it becomes a structural material at 170,000 psi or

TABLE III

REPRESENTATIVE CHEMICAL ANALYSES OF COMMERCIALLY AVAILABLE PRECIPITATION HARDENING STAINLESS STEELS

Manufacturer	Trade Name	C	Mn	Si	Ni	Cr	Ti	Al
U. S. Steel Corp.	Stainless W	.07	.50	.50	7.0	17.0	.70	.20
Crucible Steel Co.	Rezistal 3311	.17	1.25	.35	23.0	21.5	...	3.25
Armco Steel Co.	17-7 PH*	.07	.60	.45	7.0	17.0	...	1.00

* for bars, a modification is termed 17-4 PH.

greater strength. This goal may actually not be too far away since several alloys are already being studied with a view to making them commercially available. Such alloys vary in strength from 140,000 to 180,000 psi. The needs of the airframe industry require that the high strength titanium alloy be adequately developed.

The new alloy may give the airframe industry even greater problems than did the aluminum alloy 75S. Forming, joining and heat treating commercially pure titanium has been fraught with difficulties. The titanium alloy may offer even greater difficulties. A look at two stress-strain curves will illustrate this. In Fig. 5 is presented a stress-strain curve for a commercially pure titanium and for a 150,000 psi strength alloy. The low ductility and relatively high yield ultimate ratio of the commercially pure titanium are respectively lowered and raised still more in the alloy. But the airframe industry is slowly but surely altering many of its operations from room temperature to elevated temperatures and the handling of new construction materials may not be a really severe blow.

New Magnesium Alloy—A second possible new material of construction may be a new magnesium alloy. At two-thirds the weight of aluminum, magnesium at a strength in excess of 45,000 psi can be a desirable construction material especially since its strength loss at aerodynamic-friction temperatures is not so great as is the case with aluminum. But the airframe industry has slowly nibbled at the forming problems attending the use of magnesium and has not yet digested this subject. A more-formable magnesium alloy with the desired strength is therefore an interesting development. Use of some 7 to 9 per cent lithium in magnesium seems to improve the formability of this otherwise "hexagonal" metal and this development merits added attention. Present developments indicate that pure magnesium with added lithium has improved formability but is of low strength. Added alloying elements improve strength to the desired levels but also detract from formability.

Speeds in excess of 6 miles per minute present an additional problem besides skin-friction temperature. Such speeds will probably be attained by the use of gas turbine power plants in place of reciprocating engines. To the airframe industry, mounting the power plant within the fuselage instead of outside the airframe is one possible configuration and this presents an additional problem. Insulated as the jet engine may be within the fuselage, radiant heat passing through the insulation is sufficient to raise the temperature of at least some of the fuselage structure to approximately 600° F.

The search is on for materials with sufficient strength at this temperature to pay their way on a strength-weight basis. The high strength titanium alloy—when developed—may fill this need adequately. In the interim development stages, the garden variety 18-8 stainless steels have been used in their harder cold rolled, tempers to pay-their-way weightwise. This has been the only available material for the application and it has been totally inadequate.

Forming Operations Tough—Forming operations with these hard tempers have been more than a headache. They have been dangerously close to being a total loss. Breakage in forming has been inordinately high in addition to the problems of forming cold worked tempers whose minimum strengths are guaranteed but whose maximum strengths have been too varied to permit having a die for one part serve adequately from one shipment of material to the second shipment.

There is now hope for a solution to this problem. The precipitation hardening stainless steels offer the desired high strength and oxidation resistance and have the particular advantage of being formable in a softer than final strength condition. Three precipitation hardenable stainless steels are now commercially available. Their representative chemical analyses are presented in Table III.

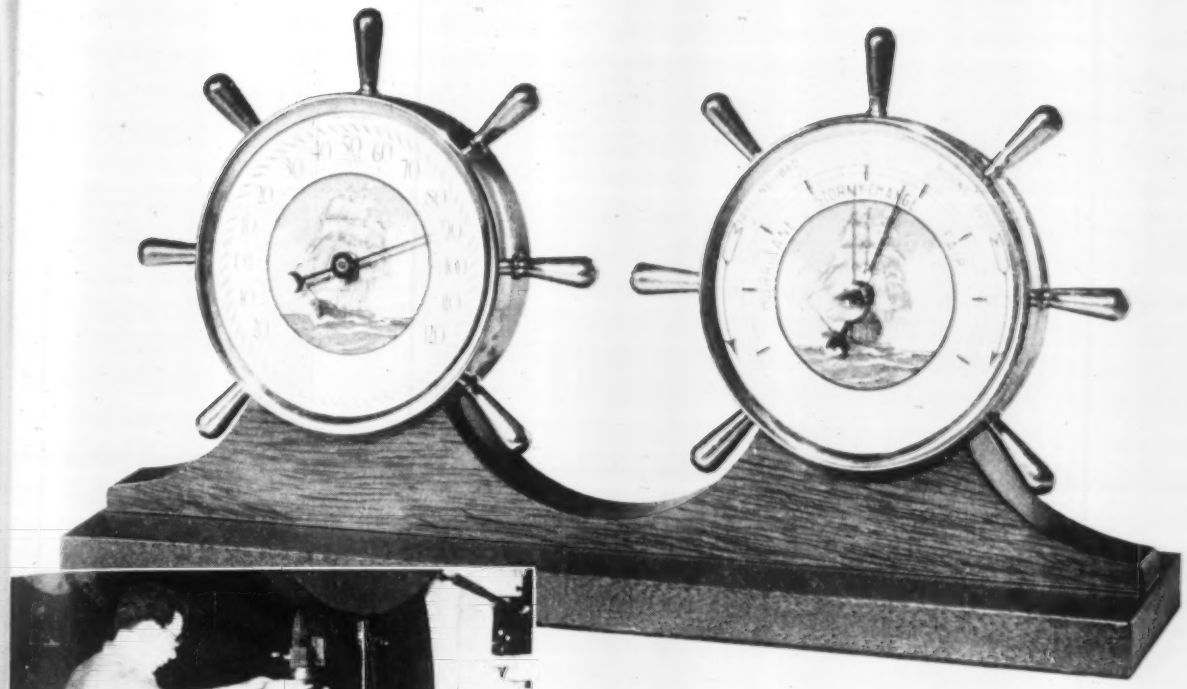
Their strength and ductility properties are particularly interesting and are presented in Table IV in comparison with the hard tempers of 18-8. While elongation in 2-inch gage length is hardly an adequate guide to formability, it is sufficiently indicative to emphasize readily the more formable character of the precipitation hardenable materials in contrast with the cold-worked stainless steels. Improving the formability of the latter with subzero forming is a development that has not yet reached commercial operations.

Of the three precipitation hardenable steels, the 17-7 PH material is finding the greatest application in view of the high strength to which it can be treated coupled with its ready formability before hardening

TABLE IV

REPRESENTATIVE STRENGTH AND DUCTILITY OF PRECIPITATION HARDENABLE STAINLESS STEELS IN COMPARISON WITH HARD TEMPERS OF 18-8

Grade	Ready for Forming — Ultimate Strength (psi)	Ready for Forming — Yield Strength (psi)	Ready for Forming — Elongation In 2" (per cent)	Precipitation Hardened — Ultimate Strength (psi)	Precipitation Hardened — Yield Strength (psi)	Precipitation Hardened — Elongation In 2" (per cent)	Hardening Treatment
Stainless W	135,000	95,000	5	210,000	195,000	5.0	950° F—½ hr.
Rezistal 3311	92,000	40,000	35	151,000	98,500	6.6	1300° F—16 hr.
17-7 PH	125,000	45,000	28	195,000	180,000	8.5	1400° F—1½ hr. Plus 975° F—1½ hr.
½ H 18-8	165,000	115,000	18				
H 18-8	195,000	150,000	12				



Typical thermometer and barometer desk set made by Standard Thermometer, Inc., 952 Dorchester Ave., Boston 25, Mass. Standard's instruments are not only sold to government, industry and over the counter, but many are also imprinted with company names and become valued gifts to top executives of important customers.

Punching spoke holes in brass cups which have been drawn, cut, and passed by inspection.

TO MEASURE TIME AND WEATHER

BEGIN WITH THE BRASS

● Standard Thermometer, Inc., is a well-known maker of thermometers, barometers, hygrometers, and clocks, for outdoor, desk, and industrial use. Naturally, brass is an important item in these instruments, being used for cases because of its golden beauty and for operating parts because of its reliable physical characteristics, including corrosion resistance.

Fabrication methods include stamping and drawing of cases and bezels. The company is an old and experienced one, dating back to 1885, and has been a Revere customer since that time. Recently it began to experience certain fabrication difficulties. When Revere heard about them, the Technical Advisory Service was asked to look into the matter. The brass being used was analyzed, and factory tools and methods studied. An elaborate 17-page report was prepared, including photographs of micro-sections to show the grain structure of various samples, and detailed recommendations were made. In general, it was found that such things as puckers, orange peel, and flare were due to a combination of factors, including composition of the brass, its temper, the dies, and the lubricant used on them. Standards were set up for metal specification and though Revere does not design dies, suggestions were made for the consideration of the designers.

After digesting the report and putting the recommendations to the proof, Standard wrote: "We are extremely grateful for this information, and it represents a splendid job and one of great value to us."

Perhaps Revere can work with you too on such matters as specification, fabrication, ideas to save precious metal. Our collaboration is freely given.

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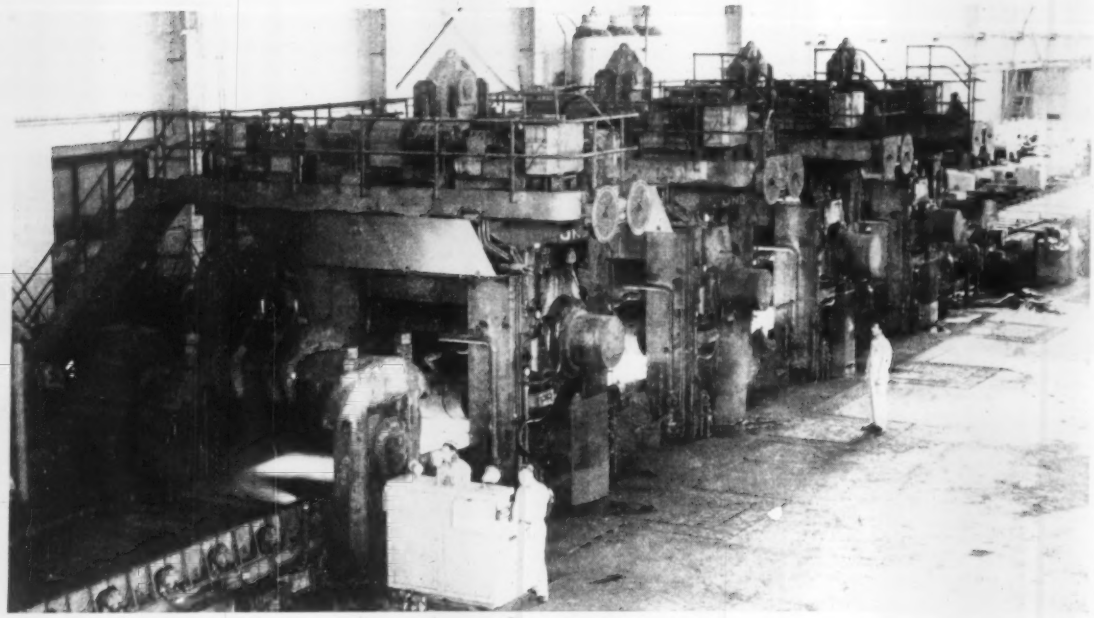
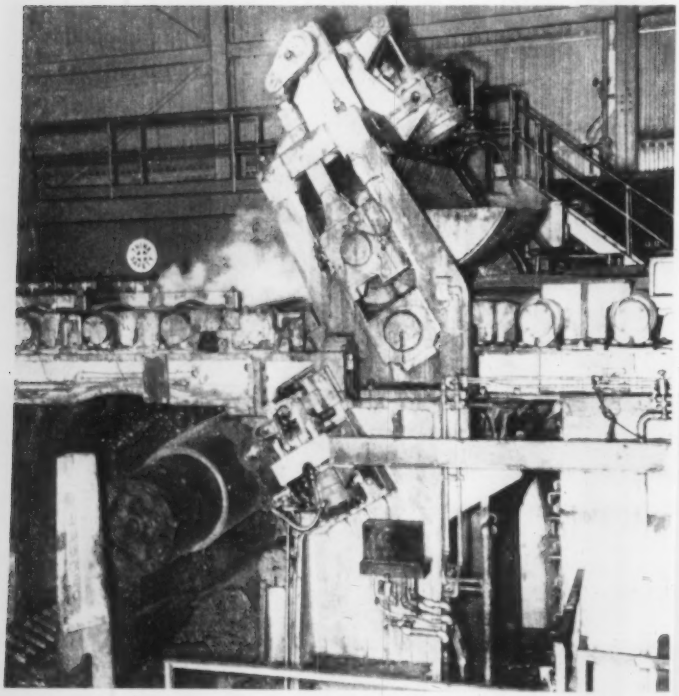


Slab passing through various stands. Delivery end of mill is shown in foreground

New 86-Inch Hot Strip Mill in Production On Pacific Coast

Four-stand 4-high unit supplies skelp for pipe mill at present but will furnish hot coils to the tin plate mill when completed early next year. New mill delivers hot product at 1500 feet per minute maximum



LIMITED operation of the 86-inch hot strip mill re cently installed by Kaiser Steel Corp. at its Fontan Calif., plant is affording an adequate supply of skel for the new electric weld pipe mill. Its output wi be stepped up when it begins rolling strip for th 200,000-ton tin plate mill which the company now ha under construction and scheduled for completion earl in 1952.

Designed to roll strip and sheet from 24 to 7 inches wide in gages from 0.078 to 0.1875, the 86-inc mill is situated at the end of the plate mill runou table, with the plate mill acting as a roughing trai The strip mill's equipment includes a flying cro shear, a pinch roll-type scale breaker, four 4-hig stands, a flying shear, a 270-foot runout table, down coiler, a 62-foot feed table and a 72-foot pilin car.

Shear Is Operated Manually—The flying crop shea is of conventional design and operated manually. Th pinch roll-type scale breaker is equipped with h draulic cleaning sprays, with the three bottom rol and the two top rolls under spring tension.

The four 4-high United Engineering stands ar placed on 19-foot centers. Backup rolls are 54 inche diameter and 86 inches long; work rolls are 27 inche diameter by 86 inches. These stands are driven b General Electric direct-current motors with Ward Leonard speed controls as described here:

Coil being made in motor-driven coiler. Pinch rolls on top help maintain tension during coiling operation

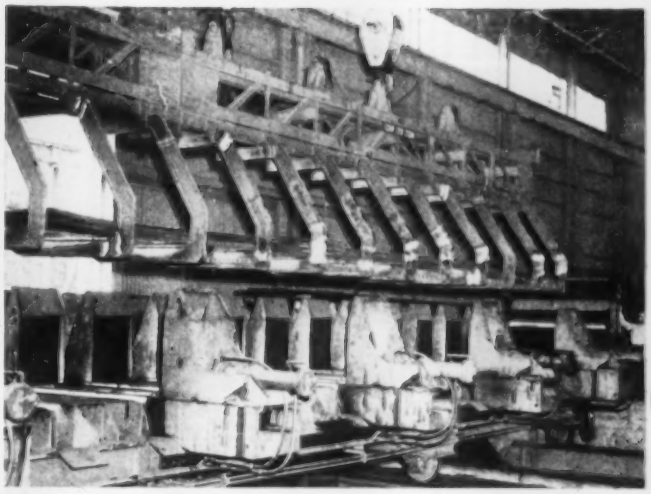
Stand No.	Motor hp	Gear reduction	Mill Speed, rpm
1	5000	4.071—1	125—250
2	5000	2.19 —1	125—281
3	5000	1.463—1	125—285
4	3500	Direct	110—290

The normal delivery speed is approximately 1400 to 1500 fpm.

The amplidyne controlled flying shear, with a capacity ½ x 84-inch material, will shear lengths up to 62 feet. Hot strip for coiling passes along a 270-foot runout table, made up of individually driven rollers on 36-inch centers, to an expanding, motor-driven mandrel type downcoiler. From here the coil is ejected onto an automatically operated car which takes it to a hot coil conveyor leading to the weighing and storage area. Cut lengths by-pass the down coiler, going directly to the 72-foot piling car.

How Finished Product Is Handled—In the finishing end, coils are passed through the McKay coil processor onto a skew table and through side trimmers. The strip is then upcut to length in the end shear, passed through a leveler, and finally piled and weighed. Cut lengths from the flying hot shear are processed on the same line after by-passing the McKay unit.

The skin mill in the finishing department contains a tilting table feeding to a skew table, a 2-high skin mill, a belt conveyor feeding the roller leveler, and a piler.



Piler car used for cut lengths and C-hook which removes and transports the flats to cooling area

Steel for the 86-inch mill comes from one of two slab reheating furnaces, through the vertical edger and side guards, into the 2-high rougher and 3-high finishing stand of the plate mill. The runout table between the 3-high mill and the flying crop shear of the hot strip mill has been electrically stepped up in speed to convey the plate without excessive heat loss.

Furnace Stirrer Purchased

Purchase of the first induction stirrer to be ordered for a production steel melting furnace in the United States is announced by Timken Roller Bearing Co., Canton, O. Although new in this country, the induction stirrer has been under development by the Swedish Electric Co. (ASEA) for several years. This firm granted manufacturing rights to the Elliott Co. of Jeannette, Pa., to manufacture the devices for Timken. Aros Electric Inc., New York, is sales representative for ASEA in this country.

Stirrer will be placed in operation upon the completion of the first of three 80-ton electric furnaces which will be a major portion of Timken company's $5.5 million expansion of steelmaking facilities. Replacing of three open-hearth furnaces with the new electric furnaces will make the company's steel and tube division a producer of electric-furnace steel exclusively and will increase capacity 14 per cent. Construction on the three new electric furnaces is expected to start in January, 1952.

Test Symposium Data Published

Papers and discussions included in the 164 page Symposium on the role of nondestructive testing in the economics of production are aimed at capturing the attention of management and are intended to present unbiased views explaining the actual or potential values of the various well-recognized methods of non-destructive testing in promoting higher quality or more economical production. Sponsored by Committee E-7 on non-destructive testing, American Society for Testing Materials, the symposium includes contributors who are men of recognized knowledge of the subject in the various fields of testing, and who have extensive experience in practical applications.

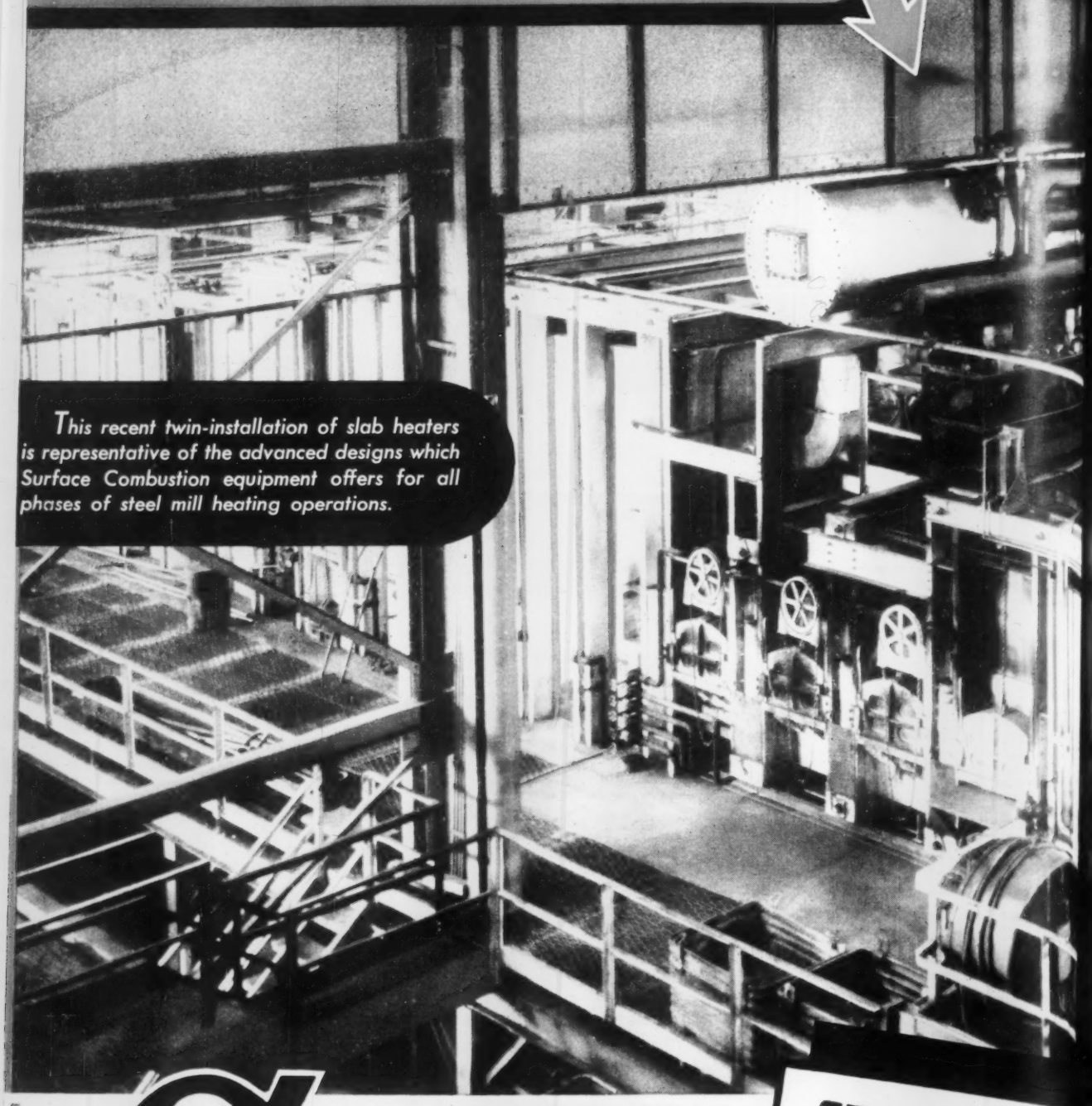
Two general papers are included covering historical background, explanations of the various test methods and generalization on the types of structural irregularities that could be detected. Three additional papers deal with specific applications of various test methods. The final one includes a general summarization, correlating the ideas expressed in the previous papers and presenting pertinent views relative to management utilization. Copies can be procured from ASTM, 1916 Race St., Philadelphia 3, at $2.50 each.

Flat Stock Line Expands

Additions to the ground flat stock line offered by DoAll Co., Des Plaines, Ill., bring the total to 203 standard sizes. Bars may be obtained in thicknesses ranging all the way from 1/64 to 1 1/4-inches and widths range from 3/16 to 14 inches. Stock is a fine grained electric furnace oil hardening tool steel. Its nondeforming qualities assure accuracy in the making of gages, punches, dies, templates, etc.

Precision smooth finish makes it ready to use immediately on the layout bench. Large range of standard sizes gives the user a greater selection to work with and makes the job easier and more economical. Local stocks are carried by the company's sales-service stores throughout the country.

One of the Latest 'Surface'



This recent twin-installation of slab heaters is representative of the advanced designs which Surface Combustion equipment offers for all phases of steel mill heating operations.

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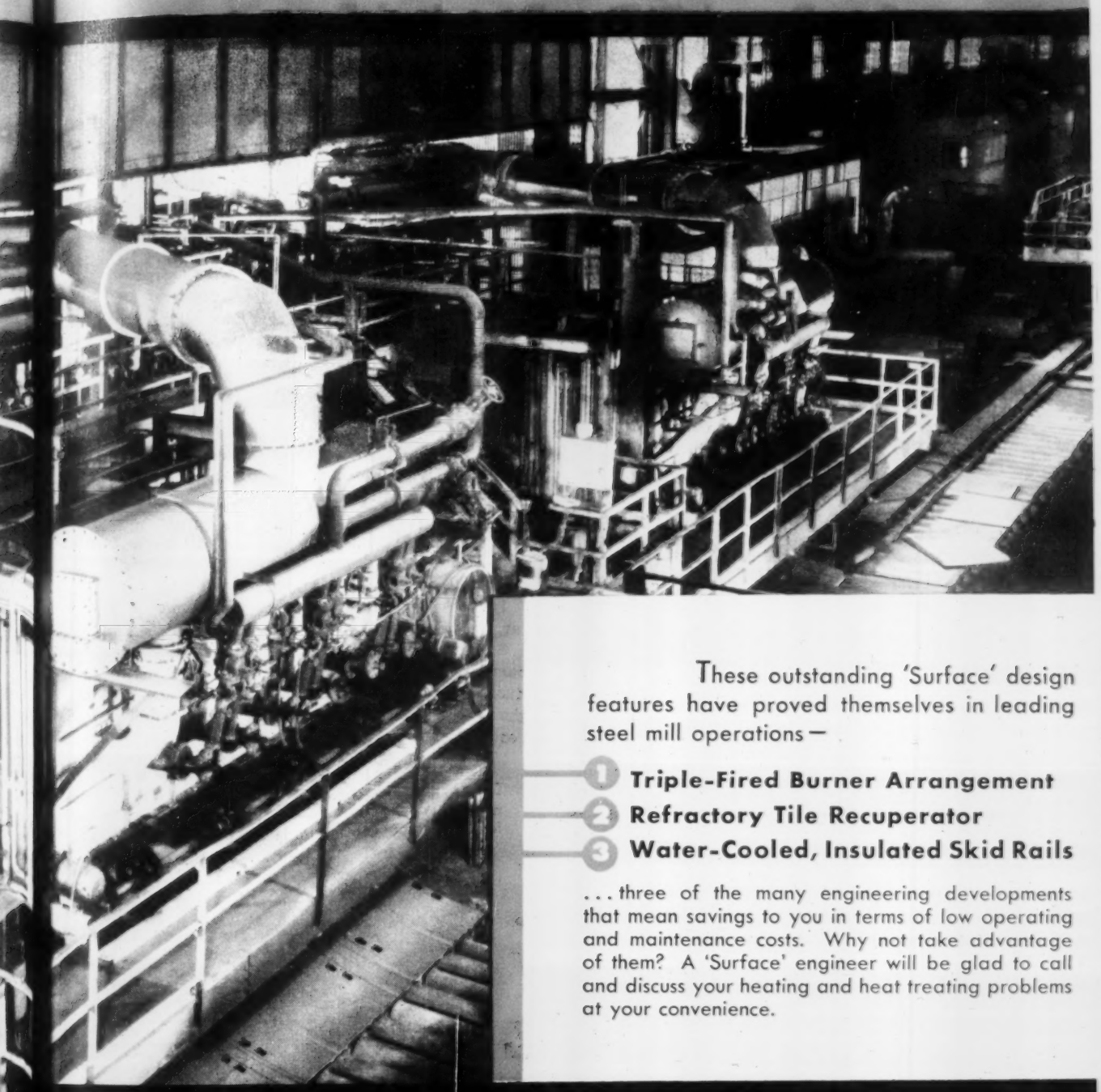

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Pit Type Convection Furnaces for Rod Annealing

Stress Relief Furnaces

Wire Patenting Furnaces

Gun Barrel Rifling Broached Faster

By FRED BOHLE
Chief Engineer
Illinois Tool Works
Chicago

UNTIL the beginning of the defense production drive preceding World War II, all rifling of small gun barrels, up to .50 caliber, was done on special rifling machines. These machines used a single point tool of correct width and helix angle carried by a head which moved back and forth through the bore of the barrel at the end of a guided rod.

In operation, the barrel was indexed at the end of each stroke and after a complete indexing, the tool was advanced. This cycle continued automatically until full depth was reached in all grooves. Lubrication was applied to the tool through the rod and head. Correct lead was imparted to the head by either a sine bar or by a helical guide. Time required to finish one .30 caliber barrel approximately 24 inches long was 20 minutes.

Seeking a faster method when production requirements expanded in 1938, Rock Island Arsenal requested broach manufacturers to submit proposals for equipment to broach .30 caliber machine gun barrels. This request marked the beginning of a long series of tests and experiments which finally resulted in the first successful rifling broach. Design of the broach and the method of broaching were patented in 1940 by Illinois Tool Works, and are under patent numbers 2,210,848 and 2,210,849.

Strict Requirements—Tolerances in rifling broaching as such are not as close as those required in some splines for automotive parts. The emphasis is primarily on finish. However, to produce a good finish, all rifling tools must have a high degree of accuracy in spite of the fact that the ultimate tolerances may be relatively liberal.

Listed in the order of importance, the following are the most essential characteristics of rifling from the standpoint of the work produced:

1. Excellent finish.
2. Dimensions within limits and good concentricity between root and land diameters of the rifling.
3. Trouble-free operation because scrap costs are extremely high.

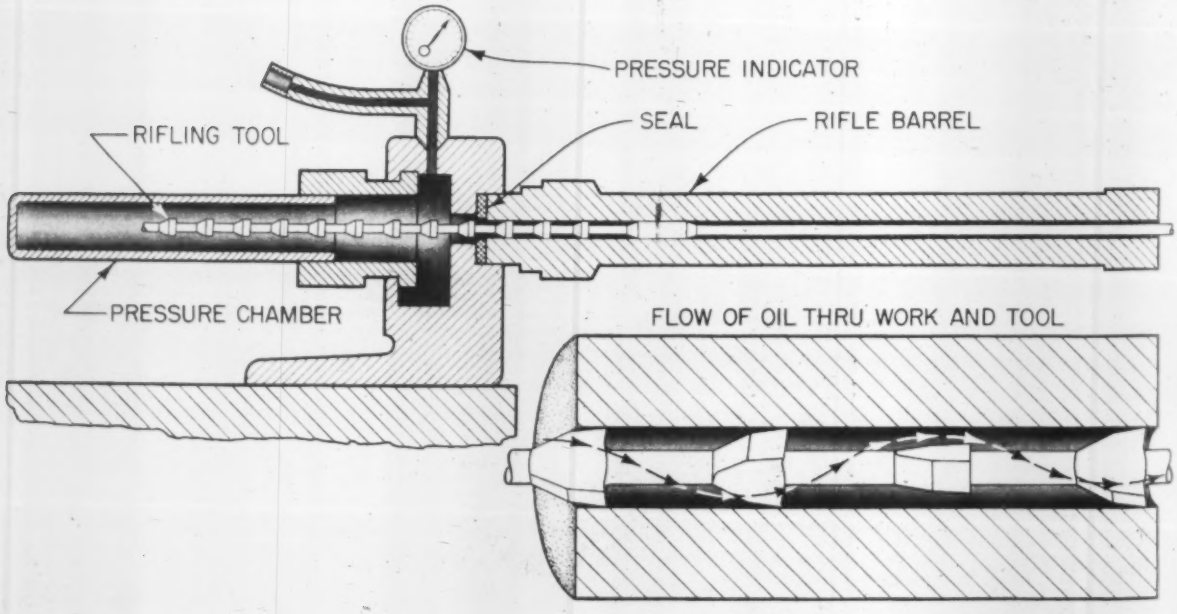
To fulfill these requirements the cutters or broaches must possess:

1. High accuracy to prevent binding and tearing.
2. Smooth finish.
3. Design features which produce concentricity and maintain the correct relationship between all cutters or broaches during subsequent sharpening.
4. Construction which facilitates a generous supply of coolant as the tool passes through the barrel.

In these respects, all rifling tools are alike for large or small caliber guns.

Small Gun Barrels—In .30 caliber to 20 mm gun barrels, the broaches are pulled through and produce their own lead. No exterior devices for turning the broach other than a freely rotating puller are required. The ability of the broaches to generate

Diagram of rifling broaching machine showing oil pressure chamber for confining lubricating oil and forcing it around the broach and through the barrel



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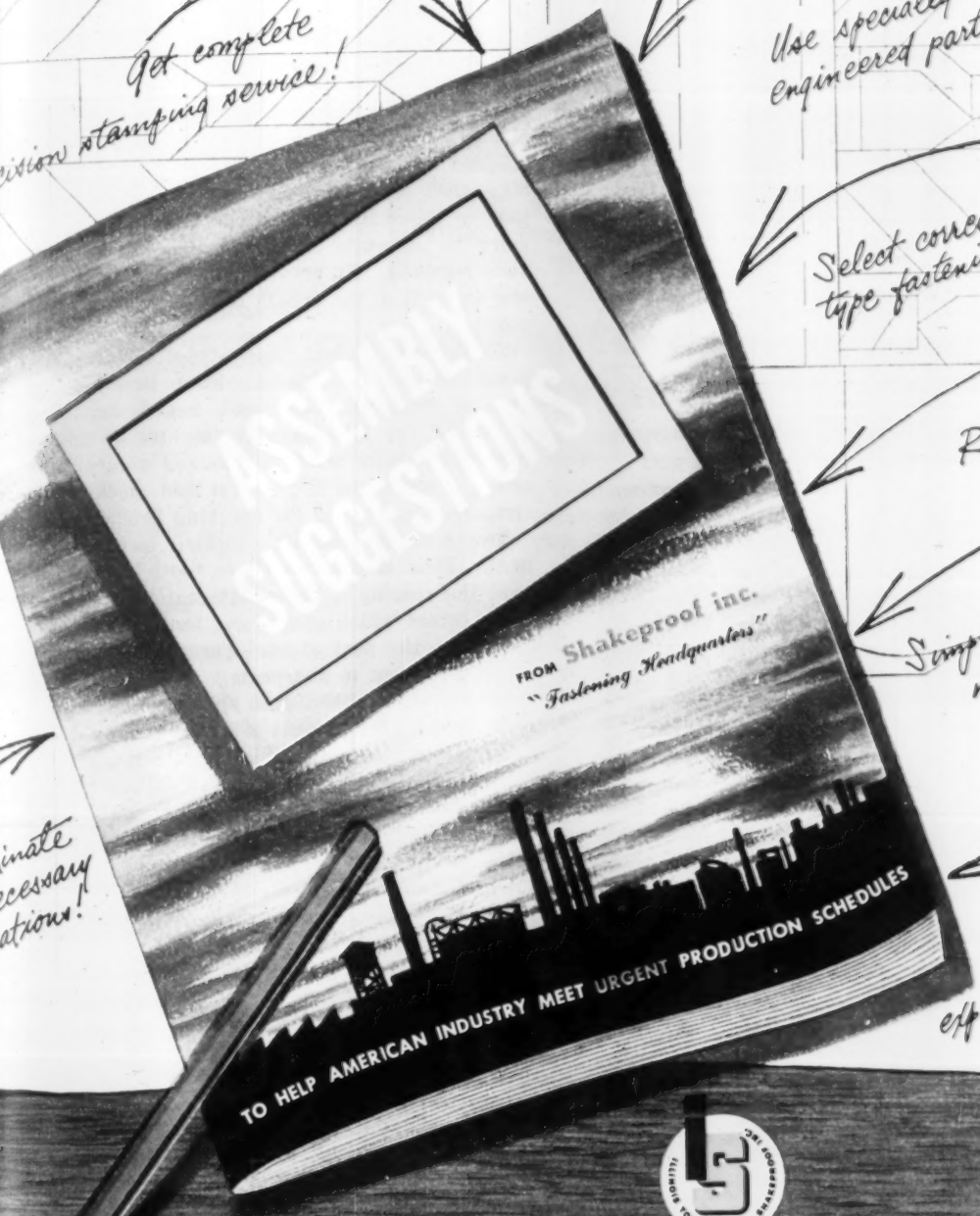

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Division of Illinois Tool Works
2501 North Keeler Avenue, Chicago 39, Illinois
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their own lead is due to the design of the broach teeth and helical chip breakers in each tooth.

Cutting lubricant is supplied under high pressure built up in a chamber which is slipped over the broach after it has been inserted into the barrel. Locked in position, the pressure chamber confines the lubricant and forces it over the broach and through the barrel. Construction of the broach facilitates the passage of large amounts of oil. Besides acting as a lubricant and coolant, the oil removes the chips from the cutting edges and accumulates them at the back of the preceding teeth.

Rifling .30 caliber barrels by broaching is from 15 to 20 times faster than with a single point tool rifling machine. This enormous time saving more than offsets the increased cost of the tools. A substantial saving in the cost of each rifle barrel is certain.

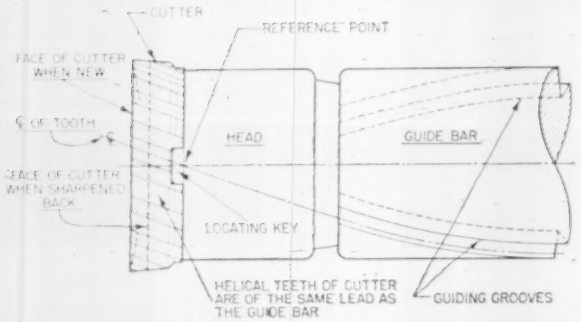


Diagram of wafer-type rifling cutter construction, location and support

Wafer-Type Cutters Used—Large guns, with bores of over 20 mm are also rifled by broaching. However, the process differs from that used on the smaller bores in that individual wafer-type rifling cutters are used instead of single solid broaches. The wafer-type cutters each represent individual broach teeth. Large caliber guns have always been rifled with individual cutters; improvements during World War II were not so much in the method as in the construction of the cutters.

New type cutters are so designed that each tooth of the cutter is arranged on a true helix with the same lead as the helix of the rifling grooves. This construction not only assures true consistency of form but keeps cutters correctly aligned regardless of whether one cutter has been sharpened more than another. It also permits inserting new cutters into a set to replace broken ones or inserting new cutters at the large end of the series, restepping the remainder for full sharpening life.

It is important that the keyways in all cutters in a set bear the same relationship to the point of intersection between the centerline of the cutter teeth (or spaces) and the back face (locating face) of the cutter. It is equally important that the spacing of the individual cutter teeth be uniform and free from gradual accumulations which add up to larger errors. Such spacing errors, errors in the location of the keyway, and lead errors result in binding, tearing, poor finish in the work and pick-up on the tools.

Tool Maintenance—Experience acquired with the initial installation at Rock Island Arsenal revealed the necessity for maintaining broaching tools in first class condition. Consequently, a series of machines designed especially for sharpening and checking rifling broaches was developed by Illinois Tool Works.

The principle of the rifling broach-sharpening machine is similar to that of any other broach-sharpening machine. However, as an adaptation to its specific duty, it is equipped with special steady rests, interchangeable grinding and polishing spindles and a diamond wheel-dressing device. It also has means for quick indexing from tooth to tooth.

Special rifling broach inspection fixtures provide for visual inspection through a microscope at 20 magnifications. Size and steps of the broach teeth are checked by a snap-gage indicator arrangement. Visual inspection of the broaches determines if they have remained free from pick-up, and follows every sharpening to ascertain that every trace of dullness has been removed. To provide for face as well as diameter inspection, the broach is swiveled to a high angle position.

Checking individual "wafer-type" rifling cutters imposes different problems. First because performance of these cutters depends heavily on the helical design of the individual cutting teeth, the lead of each tooth helix must be checked accurately. This check is performed in a helical lead checking machine similar to those used for checking helical gears.

Two separate spacing checking methods must be used. First is the "tooth to tooth" check to compare the spacing between adjacent teeth. It catches those errors which come from faulty index plates or failure on the part of the operator to let the grinding cuts die out in sharpening.

Second is the 180-degree spacing check to uncover more obscure errors that originate from out-of-round holes, arbor runout, wobble and runout of the index plates. These errors are reflected very little in the spacing of adjacent teeth but their accumulated effect is usually more serious because the size of the total error is likely to be greater.

Once the original accuracy of a set of wafer-type rifling cutters is established by these methods at the tool manufacturer's plant, careful inspection during their entire production life is still essential.

Poorly sharpened or nicked cutters will not produce satisfactory finishes and sizes must be controlled to maintain proper stepping between adjacent cutters in the set. A special inspection fixture, providing 20 power magnification for visual inspection of cutting edges and accurate diameter check, simplifies this process.

Standco Broadens Its Base

Standco Brake Lining Co., Houston, has entered the clutch facings field. Company is producing and marketing a new heavy-duty clutch facing in both the gear tooth and plain disk-types for use in the oil production, marine, earth-moving and heavy transportation equipment industries.

Gaging Lab Pays Off

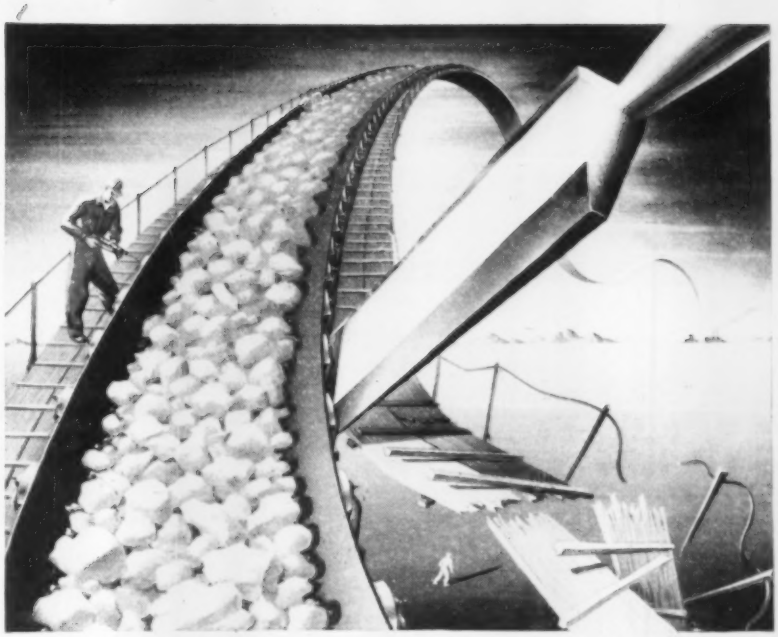
Costly mistakes eliminated by checking of measuring devices in Westinghouse plant

MISTAKES in measurement even though tiny can cost a lot of money in the construction of large and intricate machines for defense production. That is one reason why Westinghouse Electric Corp.'s Transformer Division in Sharon, Pa., has set up its own miniature "bureau of standards."

Equipped with the latest in precision measuring instruments, the gage laboratory and equipment controlled by it represent an investment of some $50,000, says George Kemper, supervisor of inspection equipment and shop processing control. A staff of trained technicians not only critically examine the accuracy of company owned instruments throughout the shop but maintain a constant check on tools personally owned by shop workers. "Making sure everybody's rule is exactly the same length may sound a little foolish," Mr. Kemper relates, "but brother it really pays off." To illustrate this point he tells of the instance when a number of large sheets had to be scrapped because they had been cut too short. On checking workers' 6-foot rules it was found that one was a fraction of an inch short.

Important Fraction — To guard against such things today the laboratory has precision instruments for checking every type of measuring device used throughout the plant of some 7000 employees. From 6-foot rules down to the smallest micrometers and patterns, no inaccuracy is too tiny to escape the attention of

MICROMETERS AREN'T LAST WORD . . . *accuracy tested by technician*



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The services of our three industrial divisions are yours, individually or collectively, according to your needs.

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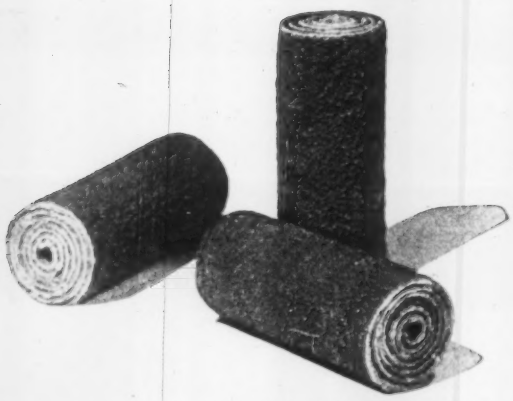

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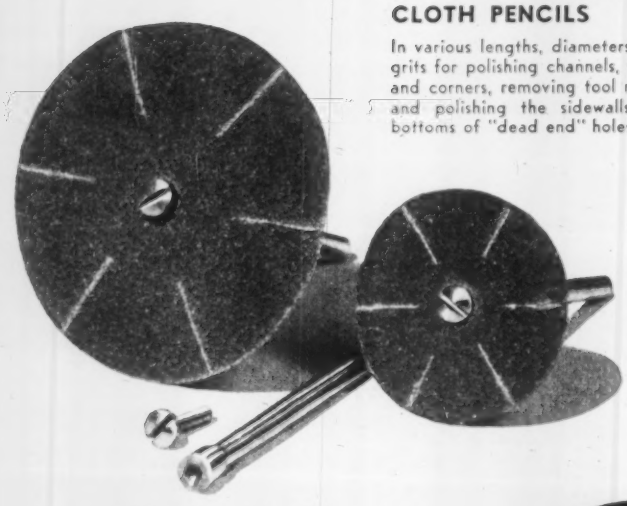
In various lengths, diameters, and grits for polishing channels, fillets, and corners, removing tool marks, and polishing the sidewalls and bottoms of "dead end" holes, etc.

LIGHTNING METALITE CLOTH SPIRAPOINTS

For odd shaped areas with varying radii and for high finishing after grinding with solid abrasive mounted points — many sizes and grits available.



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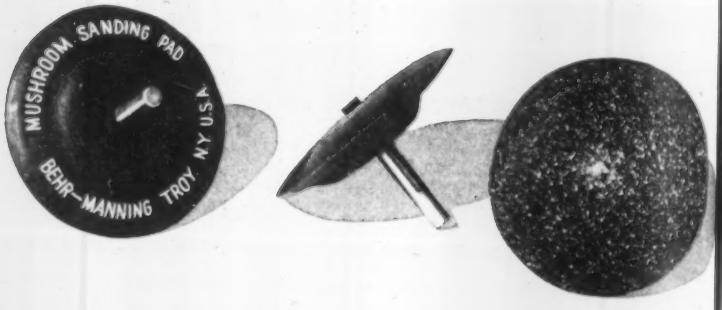

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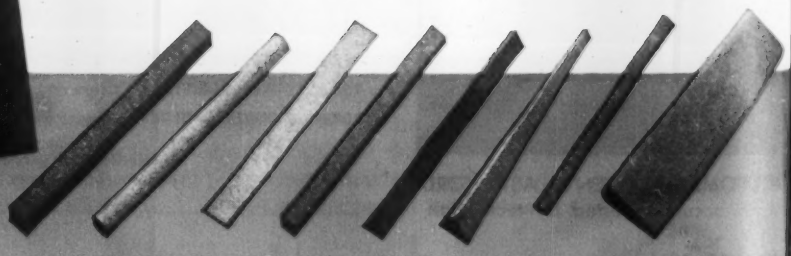

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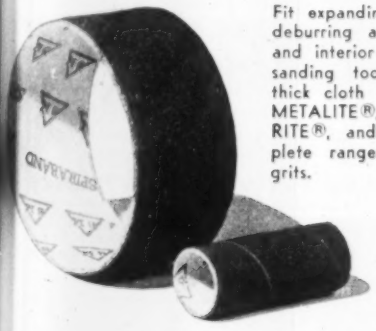

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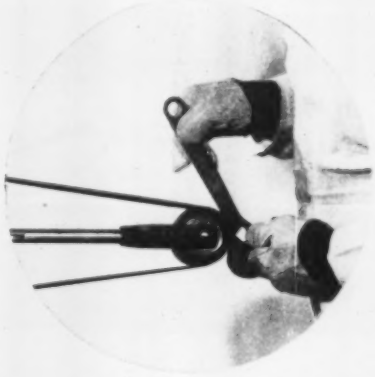

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the gage lab technicians and their precision tools. While 95 per cent of the parts that make up an electrical transformer can be measured by ordinary means, an all important 5 per cent depend on the highly accurate measurements made possible by the gage laboratory.

Many workmen use inside micrometers to measure inside diameters of oil pump motor frames, steel tanks and other parts. To check the accuracy of these instruments the gage laboratory has a Pla-Chek which is accurate to 0.00005-inch and can detect an error of 0.0001. A laboratory technician is shown making such a check in the accompanying illustration on p. 95.

Tiny patterns and gages too small to be measured conveniently by ordinary means are checked in a comparator. Each thousandth of an inch on the template appears as 1/16-inch on the screen.

No Sweaty Hands — Hoke blocks ground to an accuracy of 3 millionths of an inch are so temperamental that only certain people can use them. Perspiration left on them by a fingerprint can destroy their accuracy so that anyone whose hands perspire excessively can not use the blocks with any degree of accuracy. The highly polished surfaces of the smooth steel blocks will cling together tenaciously without any magnetic force if they are wrung together in the proper way.

These blocks in sets containing 85 sizes from which more than 120,000 gaging lengths may be obtained are used in the laboratory as a means of comparative measurement.

While not exactly a measurement function, a process control chart board plays an important role in the quality control program of the Transformer Division. Many of the plant's processes are recorded continuously on revolving circular graphs, providing an hour by hour record of temperature, pressure, vacuum or humidity of the furnaces, ovens, tanks, vacuums, etc., in the plant. With all such graphs in one central location checking the operation of the various units in the plant is simplified. An active file of all these graphs is maintained by the laboratory for six months and then they are retired to an inactive file for two years.

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Bellmouth for testing jet engines spun and fabricated of stainless steel.

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The parts or products you see here reflect what can be done by spinning and fabricating in combination. This resourceful approach provides a wide range of opportunities in many metals that you are invited to discuss with Spincraft engineers. The answer you want cannot be guaranteed, but others have been helped so often and so well that Spincraft has become the world's largest metal spinning and fabricating plant. Call or write

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Heretofore known as Milwaukee Metal Spinning Co.

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Ordnance Tank-Automotive Vehicles

(*Continued from Page 75*)

the "Detrola" division of the TAC. A staff of 1400 is busy six days a week on such functions as stock control, spare parts procurement, (a spare parts "kit" is purchased for every 100 vehicles), field service parts and tools procurement, issuing subproduction orders to the 14 ordnance districts, and general "paper control" in placement of contracts.

One section of Detrola was given over for a time to long rows of "bid boards" which prospective subcontractors could examine before submitting bids on items which they could supply. This technique has given way to negotiated contracts with "primes", the latter then assuming the responsibility for subcontracting.

Over $3 billion in tank-automotive contracts has been committed in the last six months. The peak of these awards has passed, under current appropriations, although they could be stepped up again if the emergency becomes more critical and additional funds are allocated for this type of ordnance.

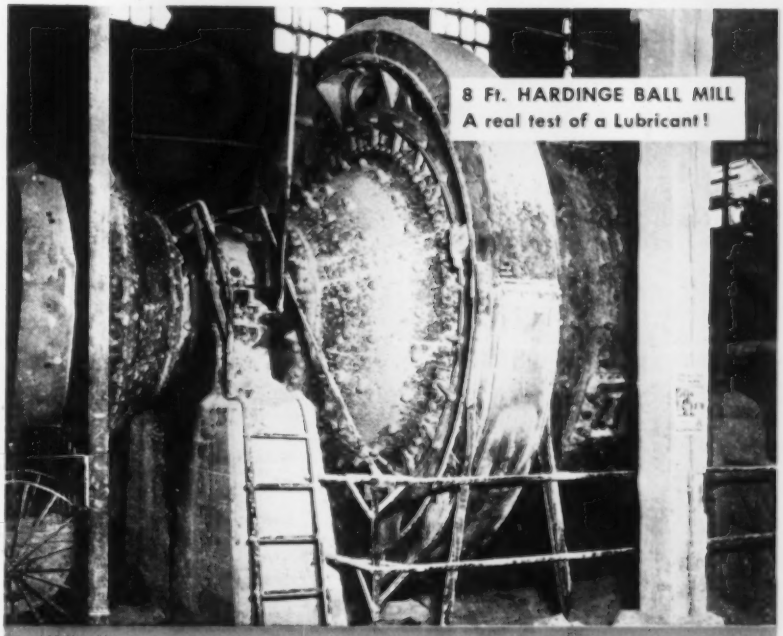
Who Gets The Prime Awards — The following list of "unclassified" contracts shows the general types of vehicles placed with the various large contractors and the estimated total amount of each contract in millions.

In most cases, only a fraction of the amount has been given the companies to date in letter orders. A typical arrangement might cover the approximate cost for tooling and 25 per cent of the remaining total amount of the contract. When work gets under way and production starts, additional funds are released. Most of the contracts are subject to price revision, both upward and downward. Security practices preclude the mention of contracts where the company is the sole source of the item involved. The list as released by TAC is shown on p. 104.

The industrial mobilization plan for tank-automotive vehicles establishes a national pattern comprising five areas corresponding generally to the distribution of heavy industry. They are: (1) Eastern seaboard, including New England and Middle Atlantic states; (2) the Rochester, N. Y.-Huntington, W. Va.-Detroit triangle; (3) the Chicago-Cincinnati-St. Louis triangle; (4) the deep South, extending from Atlanta to Houston, and north to include Nashville and Memphis; and (5) the Pacific Coast. Intention is to develop in each area, as nearly as practicable, a self-contained combat-vehicle building economy with complete facilities for assembly and adequate sources for all components and supplies. This strategic, economic and sociological dispersion —still some distance from realization —is considered essential to a sound internal economy under probable conditions of future warfare.

As the research and development center for combat vehicles, the Detroit Arsenal is becoming a novel type of workshop where considerable ingenuity must be used to circumvent manufacturing bottlenecks. Thus it boasts many unusual tools and many unusual adaptations of tools where small-lot production is the rule.

Duplications Save Profiling Time— In machining an outer turret ring, which may run from 80 to 87 inches in diameter, the section has to be finished most carefully since it serves as a ball race on which the heavy tank turret rides. Tolerance is held to 0.003-inch on the diameter and the curvature in which the ball bearings travel must be exact. Any "sloppiness" will result in destroying the accuracy of fire-control equipment. The rings are of SAE 4140 steel and formerly required 14 hours to finish machine on a boring mill. By setting up a universal duplicator on the machine and following a precision template, machining time was reduced to 75 minutes. Tools were changed to carbide and speeds greatly increased. The ball race is flame hardened after machining in the remarkable time of 66



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—so writes the SPOKANE PORTLAND CEMENT COMPANY of Irvin, Wash.

"**Lubriplate Lubricants** enabled us to cut the number of lubricants we were using to about half, but even then we were still using five different LUBRIPLATE Products. With the introduction of LUBRIPLATE No. 630-AA, we were able to reduce our requirements still further. Today we are satisfying all our needs for solid type lubricants with only two LUBRIPLATE Products. LUBRIPLATE No. 630-AA might almost be considered a Universal Lubricant. Furthermore, LUBRIPLATE No. 630-AA has effected a marked savings in lubricants and labor."

Frank D. Neill
General Superintendent

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OFF
RESET
OPEN COVER
WESTINGHOUSE
WESTINGHOUSE
Life-Line
DO NOT LUBRICATE

FREE maintenance men for other important jobs with these two

Why nurse motors and controls? This pair stands on its own feet . . . takes the increased production rate without "babying". For example: Life-Line motors need no lubrication . . . free men for other maintenance duties. Just install Life-Line and forget them. Life-Linestarters® cut maintenance, too. You can take one apart with a screw driver—in two minutes. One single moving element. No sliding members . . . nothing to stick or jam. These features pay off. Take the case of an eastern plant, for example:

They installed ten new punch presses. Shortly, motor overheating and burnouts resulted. A check revealed lack of lubrication as the trouble. Motors installed fourteen feet above floor level were "forgotten".

Life-Lines have replaced these troublemakers. Result? No more outages. Motors are still forgotten—but safely. They *need no lubrication.*

How about the starters? Many times vibration or a sudden shock from the press caused ordinary starters with gravity-type operation to open. This stopped production. But with the Life-Linestarter, faulty operation is a thing of the past. The inverted, clapper-type design will not open from shock or vibration.

Here is but one example from many where Life-Line motors and Life-Linestarters paid off on the production line . . . freed maintenance people for other duties.

Why not take advantage of this Life-Line production team? It costs no more. A check with your Westinghouse representative will give you the complete facts on each. Ask him for copies of "Life-Line Motor Book", B-3842 and "Tomorrow's Starter Today", B-4677. He has copies for you. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-21628

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Allison

ABRASIVE CUTTING WHEELS

Company	Estimated Amount of Contract (Millions)	Items
Allis-Chalmers Mfg. Co.	$188	Tactical vehicles
Allison Div., GMC	26	Transmissions for combat vehicles
American Car & Foundry Co.	100	Combat vehicles
American Locomotive Co.	200	Combat vehicles
American Steel Foundries	15.8	Armor castings
Buick Motor Div., GMC	65	Transmissions for combat vehicles
Cadillac Motor Co. Div., GMC	470	Tanks
Chevrolet Motor Div., GMC	6	Administrative vehicles
Chrysler Corp.	522.5	Tanks, tactical vehicles and tank engines
Continental Motors Inc.	95	Engines
Diamond T Mfg. Co.	52.5	Tactical vehicles (wheeled)
Federal Motor Truck Co.	10	Tactical vehicles
Firestone Tire & Rubber Co.	23.5	Track
Fisher Body Div., GMC	195	Tanks
Ford Motor Co.	235	Tanks and engines and other components therefore
Fruehauf Trailer Co.	34	Trailers
Food Machinery Co.	177.5	Combat vehicles
Goodyear Tire & Rubber Co.	23.5	Track
International Harvester Co.	382	Combat and tactical vehicles
Mack Trucks Inc.	25	5-Ton dump trucks
Massey-Harris Co.	55	Combat vehicles
Pacific Car & Foundry Co.	56	Combat vehicles
Pontiac Motor Div., GMC	45	Amphibious cargo carriers
Reo Motors Inc.	65.2	Tactical vehicles
Studebaker Corp.	76.6	Tactical vehicles
Timken-Detroit Axle Co.	29	Components
Truck & Coach Div., GMC	141	Tactical vehicles
Willys-Overland Motors Inc.	95.5	Tactical vehicles

minutes. This was accomplished, as explained by Andy C. Dickson, general foreman, simply by "pouring more gas" into the burners. Under study is a new method of induction hardening the race by means of a curved traveling shoe (now in use at Cadillac-Cleveland) which would heat and quench continuously at a rate of 1 inch per second.

Another successful application of duplicators is on twin horizontal boring mills which profile the final drive openings in thick armor plate hulls. The method is particularly effective in cutting out other elliptical-shaped openings in the sides of hulls, done on the same setup.

Cutting teeth on the internal gear of the turret ring, another precision job, formerly required 3½ hours. This was reduced to 12 minutes by changing to broaching, using a standard broaching machine adapted to the job and forming 12 teeth at a time, with 14 indexes per ring.

Want Bigger Armor Castings—There is a trend toward armor plate hulls cast in a single piece, instead of the combination of rolled and cast armor. Foundries are now setting up the cast hulls for a new heavy tank and they will be striking examples of heavy casting techniques. The cast hull is more easily machined, being mounted on a bed plate and the various machines "moved into the work" rather than trying to set up the work in a machine. Multiple operations can be carried out in this fashion, speeding up the finished product.

Experience in World War II washed away much of the former mystery connected with armor steels, both rolled and cast. Proper alloying and heat treatment gave the desired ballistic qualities, with no secret pinches of "armorizing" compounds being involved. Face-hardened plate has generally given way to homogeneous types, and nickel is no longer considered an essential alloying element in homogeneous armor. Manganese and molybdenum, in relatively low percentages, will provide the necessary hardness and impact values except when manganese is used as the alloying agent. Boron treatments of armor heats have proved effective. Much more is known now about how to avoid low-temperature embrittlement of welds in rolled armor.

Heat treatment of cast armor involves homogenizing at 1900-2000° F, austenitizing at 1475-1550, water quenching and tempering at 1100-1200. Above everything else in armor steel, whether cast or rolled, is the matter of cleanliness of the metal, freedom from inclusions and general prime quality.

New Products and Equipment

Circular Knife Grinder

Precision circular knives may be ground accurately and economically with a Landis tool slitter knife grinding machine made by Landis Tool Co., Waynesboro, Pa. Machine may be used for the manufacturing or resharpening of circular knives. Slitter knives up to 6 inches in diameter may be ground on the machine with full size wheel. This size permits 170 degree oscillation of the work head. Minimum size knife is 1½ inches in diameter with 145 degree oscillation. A 16-inch diameter grinding wheel with 1-inch face is standard

equipment. This wheel is driven by a 3 hp motor.

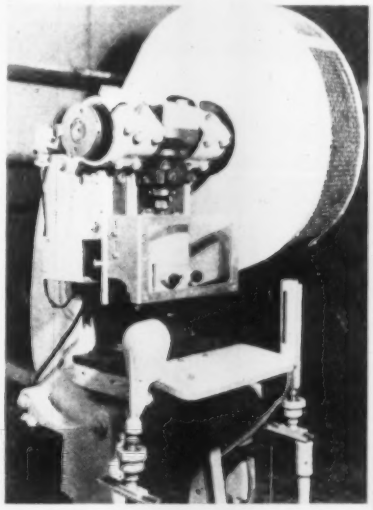
Grinder is equipped with an automatic grinding wheel feed and includes a rapid infeed and retraction for wheel clearance and loading. Grinding feed provides a maximum of 0.035-inch slow feed movement. Both amount and rate of grinding feed are adjustable.

Check No. 1 on Reply Card for more Details

Punch Press Safety

An electronic controlled automatic safety and barrier gate guard made by Hoffman Engineering Corp., Anoka, Minn., is adaptable for power presses and operations where mechanically operated barriers appear inadequate or undesirable. There are no moving mechanical parts in front of the operator to bar the view of the die sets, the light source on the guard illuminates the operating area. Continued maintenance is not required nor is it necessary to make frequent adjustments or careful inspection.

Failure of any of the electronic parts in the guard renders the press inoperative. Press may be operated, however, without using the guard by attaching the lock-out bar provided. Barrier gate circuit through the relay contact remains open as long as

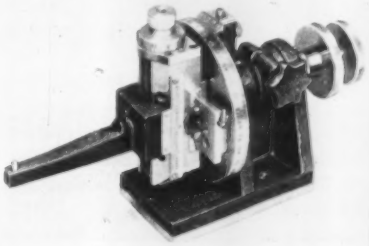


the light beam remains unbroken. When the light beam becomes broken during the stroke of the press, contact of the relay closes, the solenoid is energized and the spring-operated barrier gate descends to the bolster plate. When the barrier gate is in a downward position it must be manually lifted to the top position in order to be reset.

Check No. 2 on Reply Card for more Details

Dresses Grinding Wheel

Tangi-Matic dresser for precision dressing of all angle-tangent-to-radius grinding wheel forms is being produced by Perfex Tool & Gage Co., 123 Avery St., Mt. Clemens, Mich. Setup



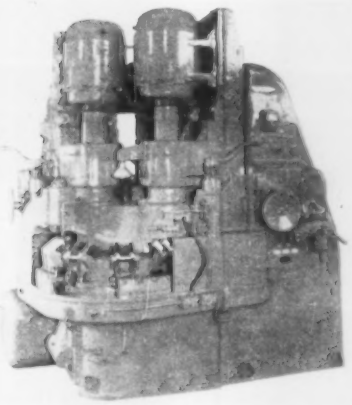
time is reduced to one-fourth the time usually required by experienced toolmakers, as it eliminates Jo blocks, height gages, micrometers or other precision instruments. A built-in micrometer provides direct reading, rapid adjustments and accuracy down to tenths. Angular settings are provided by a vernier scale, graduated to minutes. Two stop dogs control desired arc.

Unit dresses concave radii as small as 0.032-inch, full 180 degrees. It dresses from the bottom of the wheel where grinding actually takes place. This permits the operator to control the wheel accurately by using the grinder draw feed. All wearing parts are steel, hardened, ground and lapped.

Check No. 3 on Reply Card for more Details

Special Grinder

A specially equipped No. 24A2 (Hanchett type) rotary surface grinder for finishing the cover of automotive oil pump bodies was completed recently by Mattison Machine Works,



Rockford, Ill. Pieces being ground are held in automatic clamping fixtures.

A safety device is provided which stops the machine in case the operator doesn't locate the work properly in the fixture. Automatic sizers are constantly in operation checking the work and keeping all of the pieces within the specified tolerances without the operator's attention.

Check No. 4 on Reply Card for more Details

Hydraulic Table

Hydraulic power is utilized throughout in operating the control of band tool speed, table feeds, etc., in the Contour-matic equipped with 36-inch stroke heavy duty hydraulic work table made by DoAll Co., Des Plaines, Ill. Machine's work height is increased and the standard 16-inch stroke tiltable hydraulic table is replaced by the larger capacity table that is used for fast, straight, ac-

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

"Bridgeport" BRASS CO. MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL

Broken wheel being braze welded using low fuming bronze rod. Repaired impeller blades and cast iron housing are on the bench.

Braze Welding on the Increase for Repair and Maintenance

Braze welding showed its value as an essential maintenance tool in World War II. Consequently, it is expected to do even a bigger job in the period ahead when equipment shortages will become a major problem.

Broken machines and equipment cause serious stoppages in production while waiting for replacement castings and parts.

Urgent repairs can be made by braze welding in a matter of minutes or possibly hours depending upon the size of the job. If properly done, the bronze weld will be stronger than the parent metal.

Advantages of Braze Welding

Welders trained to repair parts with cast iron or steel welding rod will find many advantages in braze welding with bronze welding rod alloys. In general, it is cheaper than welding with steel especially when big, heavy parts are involved.

When welding cast iron or steel parts with steel or iron welding rod, in order to prevent stresses and warping, it may be necessary to preheat slowly the entire casting prior to welding and to allow the casting to cool slowly after the weld is made. However, in the case of braze welding, elaborate preheating and slow cooling of the casting are seldom required.

With braze welding, it is only necessary to heat the surface of the parent metal to a cherry-red heat. This is sufficient to produce the "tinning action" whereby the molten bronze firmly adheres to the red-hot surface of the parent metal.

Preparation

Certain precautions should be observed with braze welding. The broken section should be properly prepared and carefully cleaned.

Many welding operations require beveling on the edges of sheets and plates prior to joining, to enable the operator to obtain adequate penetration of the weld metal into the root of the weld. Where beveling is done by machining, little more cleaning is required. A wire brush may be used to remove any slight film of oil remaining after the machining process, and to eliminate any dirt picked up in handling. It will still be necessary to remove oxides, dirt, etc., near the edges of the joint as the machining cleans the metal only along the beveled edge itself.

When a grinder is used, it is advisable to brush away all particles of abrasive material which may have accumulated on the work. The important point is to eliminate all dirt and to break through and remove any oxide that may be present. Other means of ensuring a clean bright surface are by chipping, sandblasting, and machining.

Cleanliness Most Important

Oil or grease are especially harmful and should not be present even as a trace on the surface to be braze welded. Since broken metal parts of a machine are generally saturated with oil, it is a good practice to burn off the oil from the prepared surface by first playing a soft flame over that area. A neutral or slightly oxodizing flame should be used for braze welding. When grinding is done on cast iron, free carbon is smeared over the surface. It is desirable to use a highly oxidizing flame to preheat and remove this carbon. Special fluxes are also available for cast iron. (cont'd pg. 2, col. 2)

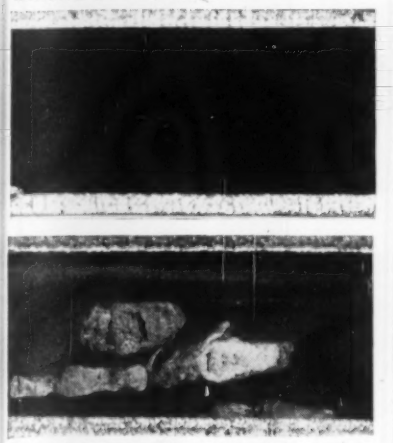
CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

DEZINCIFICATION CORROSION (Cont'd)

A series of tests were undertaken to study the mechanism of dezincification. These tests revealed that certain corrosion products, zinc hydroxide, ferric hydroxide, rust, cotton and many other gelatinous or porous materials will initiate dezincification in brasses containing more than 15-20% zinc in non-scale forming waters.

This explains why water-borne materials deposited in horizontal sections of piping and tubing have on occasion led to plug-type dezincification on the floor of the pipe. In figure 1 is shown an instance of dezincification obviously initiated in this manner.



Bottom half, longitudinal section of yellow brass pipe showing nodules of corrosion products covering areas of plug-type dezincification developed on the floor of the pipe. Note absence of nodules in top half of pipe.

Certain suspended or floating materials can be deposited on vertical surfaces with the corrosion being distributed in a random fashion or localized at the water line.

The porous deposits or crevices lead to the formation of an oxygen concentration cell with the most severe corrosion being localized beneath the deposit (lowest oxygen concentration) and the surrounding area virtually free from corrosion (higher oxygen concentration).

Practically all of the copper formed in the screened area deposits at or near the point where it originally dissolved. The copper mass may later act as a cathode in the copper/brass galvanic cell which stimulates further attack. The anodic solution beneath the deposit (within the nodule of corrosion product) becomes more acid (lower pH) than the surrounding water (appreciably higher pH), and is acid enough to keep the dissolved zinc in solution.

The zinc ions which move to the edge of the copper mass may be carried away by flowing water or may be precipitated by contact with the water to form irregularly honeycombed deposits (nodules) of zinc oxychloride, as shown in the photograph. The nodules continue to grow, as long as the cell is active, by slow continuous precipitation of zinc ions exuding from one or more minute openings in the nodule. Under some conditions, it is possible to obtain some idea of the extent of dezincification from the size of the nodule. Where the force of gravity or low flow is continuously effective, the nodules grow in the direction of the flow with dezincification very often spreading beneath the growing nodules.

At continuous high flow, zinc ions may be swept away thereby preventing the formation of any appreciable amount of zinc corrosion products. At very high rates of water flow, dezincification usually cannot take place.

Braze Welding

(cont'd from page 1)

Any dirt, grease, oxides, etc., left on the work at the joint may easily be entrapped in the finished weld, preventing a strong bond between the parent metal and the bronze. Any foreign matter caught in the weld weakens the joint and increases the chances of early failure. When liquids or gases are concerned a weak bond may allow leakage along the joint between the base metal and the weld metal. (6599)

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Paint Spray Gun uses super-heated steam in place of compressed air. Designed for production use in metal-product finishing, the gun is said to provide 10 to 20% savings in finishing materials. The assembly includes a finger guard, adjustable fluid needle and a spray head with a one-piece steam cap and fluid nozzle. **No. 1137**

Circular Hole Cutter is adjustable to cut any size hole within its range in metals, plastic or wood with micrometer type adjusting screw. Two types are available: one with round shank for hand drills or drill presses, and the other with square, tapered shank for hand brace. Maximum hole diameter ranges from 4 to 6", depending on the model. All are equipped with a high speed steel cutting bit. **No. 1138**

Lapping Machine is equipped with magazine feed attachment that feeds flat work pieces down a spiral trough one at a time onto the machine table. Each piece lies in a depression in the rotating table, and is carried between the upper and lower laps from the outer rim to the inner rim and back again, where it is discharged. The machine is said to make lap-dressing automatic, requiring only an unskilled operator to keep the hopper filled and remove finished work. **No. 1139**

Predetermined Counter indicates number of operations still to be performed at all times, and automatically stops the operation when that number is reached. Settings are made by dialing the number on telephone type dials. Corrections or changes can be made while the counter is in operation. Two models are available, with three dials for counting up to 999, and with four dials up to 9,999. **No. 1140**

Oil-Hydraulic Press designed for fast action with high-tonnage pressures under accurate control. The 50-ton press has a 15" stroke, 24" daylight opening and 31 x 19½" work surface. Approach of ram to work can be adjusted to any speed up to 290" per minute, with pressing speeds up to 145" per minute. It is available in manual or automatic models, and can be equipped with dual hand lever, single lever, foot pedal or electric push-button type controls. Accessories include index table feed for either 6 or 12 stations. **No. 1141**

Automatic Work Positioner rotates at any desired speed from 0 to 5 rpm. Designed for automatic, semi-automatic, manual arc and heli-arc welding and brazing operations, the device features a solenoid-actuated clutch which permits instant stop and start of the work table. The table—which can be tilted in any position about 360°—holds work up to 16" in length. Weight capacity rating is 500 lbs. **No. 1142**

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Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal
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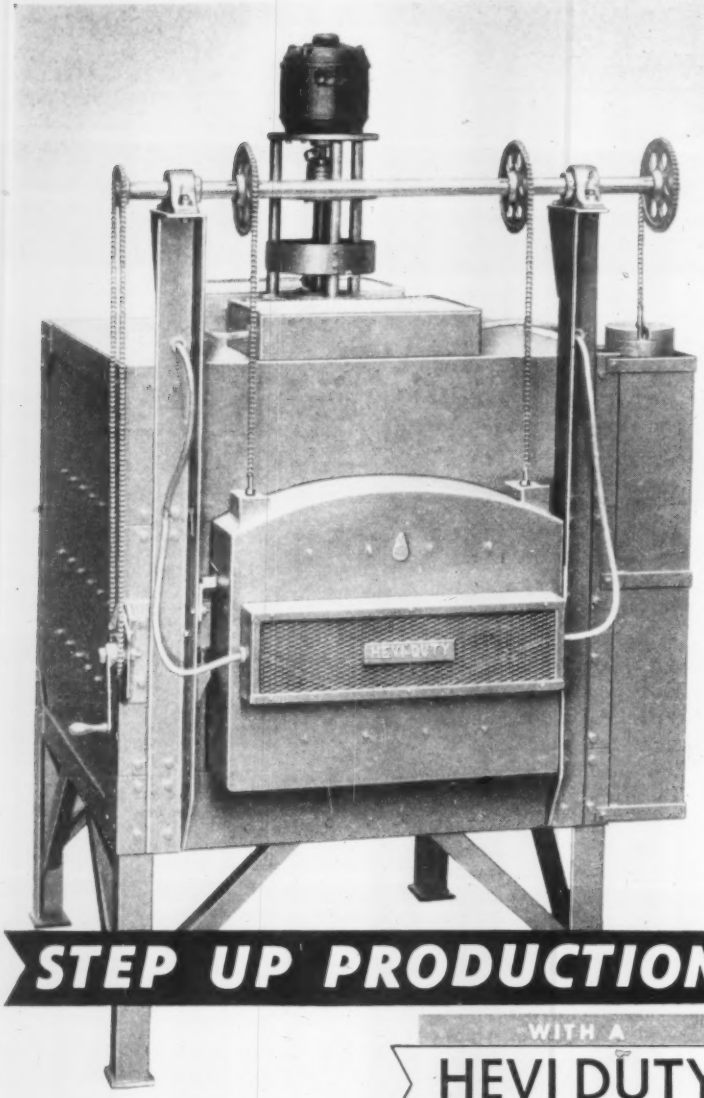

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Multi-Range
BOX TYPE
Convection
FURNACE
For Uniform Temperatures
400° F. to 1850° F.

Here is an all-purpose furnace with a wide range of temperatures and high degree of uniformity. These furnaces are equipped with powerful centrifugal type alloy fans designed to operate throughout all working temperatures.

Hevi Duty Multi-Range furnaces are especially suitable for drawing, tempering, and annealing of non-ferrous metals, aluminum brazing, annealing cast iron, normalizing and hardening of steels either with or without a protective atmosphere.

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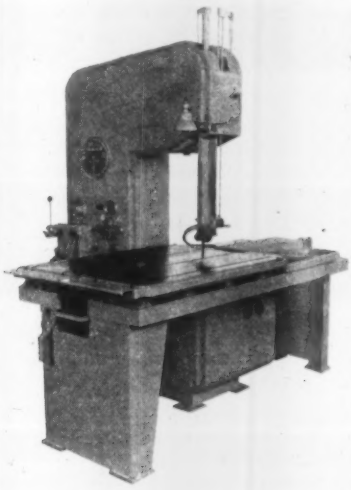
DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

MILWAUKEE 1, WISCONSIN

curate perpendicular power f band sawing, slotting and grinding close tolerances.

Operation of this unit is accomplished hydraulically by control knobs in a central panel on the column of the machine convenient to the operator. Table will easily handle work

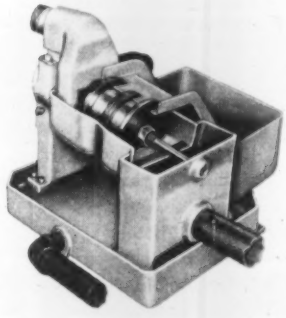


weighing up to one ton. Its feed rate is variable to 18 fpm with rapid return and it slides over 28 rollers actuated by hydraulic pressure up to 200 psi.

Check No. 5 on Reply Card for more Details

Contaminants Removed

Houdaille magnetic clarifier introduced by the Honan-Crane Corp. Lebanon, Ind., removes over 98 per cent of contaminants from liquid coolants and provides continuous delivery of clean coolant to machine



sump for re-use. It is designed for individual application on machine tools such as wet surface grinders thread grinders, milling machines gear shapers, etc.

Removal of metallic and abrasive particles is accomplished by use of permanent ring magnets completely enclosed in revolving nonmagnetic cylinder. Circular steel disks, end

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RUSH SERVICE
ON
HEAVY INDUSTRIAL GEARS

SIMONDS is geared to serve you *fast* on all large and heavy-duty industrial gear requirements. You get personalized attention, with accuracy and quality assured by nearly 60 years of specialized experience. SIMONDS' central location assures prompt delivery on all types and sizes, up to 145" in dia. and including cast or forged steel, gray iron, bronze, Meehanite, rawhide and bakelite. SIMONDS also is stock carrying distributor for Ramsey Silent Chain Drives and Couplings, and industrial V-Belts.

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pieces of the cylinder acting as magnetic poles, seal off the magnet cores to prevent fluid from coming in contact with magnets. This design provides 360-degrees of constant magnetic attraction. Turbulent flow of coolant beneath cylinder keeps metallic particles in suspension until attracted to metallic poles. Unit is rated at 20 gpm. If flow rate increases beyond rated capacity, excess coolant automatically overflows into base of unit before reaching magnetic field. Unit is 22⅝-inches long, 16½-inches high and 15-3/16-inches wide. It operates on 1/12 hp, 60 cycle 110 v single phase motor.

Check No. 6 on Reply Card for more Details

Forging and Casting Handler

A conveyor series identified as Universal 500-F designed for handling all types of forgings and castings is added to the line that is made by Industrial Engineering & Mfg. Co., Brimfield, Ind. Model 500-F is built

with double-bottom trough and heavy bar flights, eliminating the belt replacement problem. It is available in four standard lengths—6, 8, 10 and 12 feet—with relative maximum elevations of 4 feet 6 inches, 5 feet 8 inches, 6 feet 10 inches and 7 feet 1 inch. Channel width is 15½ inches.

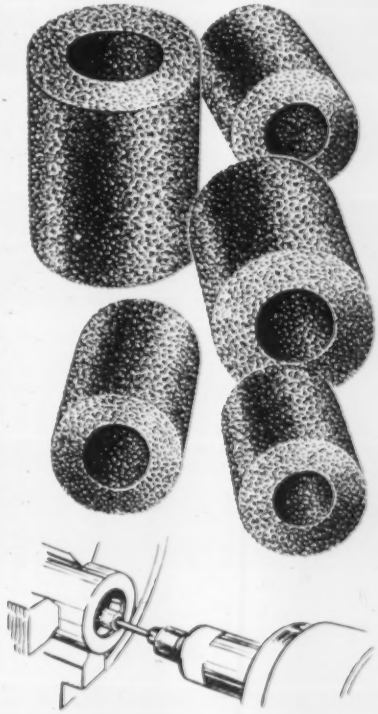
Chain speed is 70 feet per minute. The motor is ¾ hp, 115-v, single phase.

Check No. 7 on Reply Card for more Details

Converts Millers

A vertical milling attachment which quickly converts standard horizontal millers for precise diversified vertical milling operations is announced by W. H. Nichols Co., 48 Woerd Ave., Waltham, Mass. It is designed to take full 1 hp drive with maximum speeds up to 2000 rpm. The heavy one-piece casting houses the entire mechanism and accurately machined alignment pads on the body casting allow for easy mount-

CHICAGO
Internal Grinding
WHEELS



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Chicago Internal Grinding Wheels produce better finishes with no sacrifice of wheel life or cutting action. They're your best buy because — they're "tailor made" to your particular specifications and on their way to you within hours after you order.

Better Wheels . . . Faster

Chicago Wheel's advanced production technique assures you perfectly balanced Internal Grinding Wheels to meet today's rigid finishing requirements. Faster deliveries, too . . . and for special jobs, overnight service is available.

WRITE TODAY for full details on all Chicago Wheel products . . . and *free* sample Chicago Internal Grinding Wheel.

CHICAGO WHEEL & MFG. CO.
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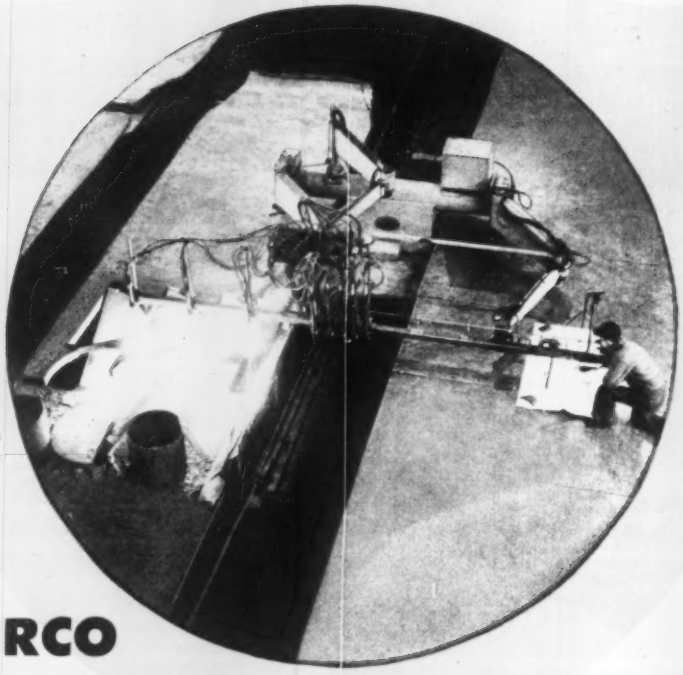

AIRCO ACCURACY... PRECISION ... OPERATING ECONOMY

designed into the all new

AIRCO NO. 50 TRAVOGRAPH

GAS CUTTING MACHINE

Airco's NEW No. 50 Travograph is a rugged, all-welded gas cutting machine. Its massive, long-lived design is engineered to give fingertip sensitivity to all production operations. Used as a basic tool for multi-torch shape cutting, squaring or beveling, its outstanding accuracy slashes reject loss and working costs to a minimum.

Today's most modern production tool, the rugged new Airco No. 50 Travograph precision-cuts steel—light plates, heavy slabs, billets, forgings—to close tolerances. Here are the reasons for its remarkable exactness . . . the "why" it guarantees faithful reproduction.

1. All-welded construction provides a combination of ruggedness, resistance to vibration, and precision operation.
2. Rigidity built into the torch-bearing pantograph arms enables the torch bar to support a uniform load of *500 lbs!*
3. Perfectly-balanced when properly set on 16' rails.
4. Ball bearings in the hinge joints make it extremely smooth operating.

For greatest operating flexibility, the new No. 50 Travograph can be equipped with three distinctly different tracing devices—manual, magnetic, or the full-automatic "Electronic Bloodhound". The "Electronic Bloodhound" needs only an outline drawing or silhouette to cut the most intricate shapes smoothly, sharply, quickly . . . and with extreme accuracy.

If your production line requires quantity flame shaping operations . . . and if close precision cutting would lower your finish-machining costs . . . it will pay you to investigate Airco's new No. 50 Travograph. For complete information write your nearest Airco office for the new catalog just coming off the press.

AIRCO

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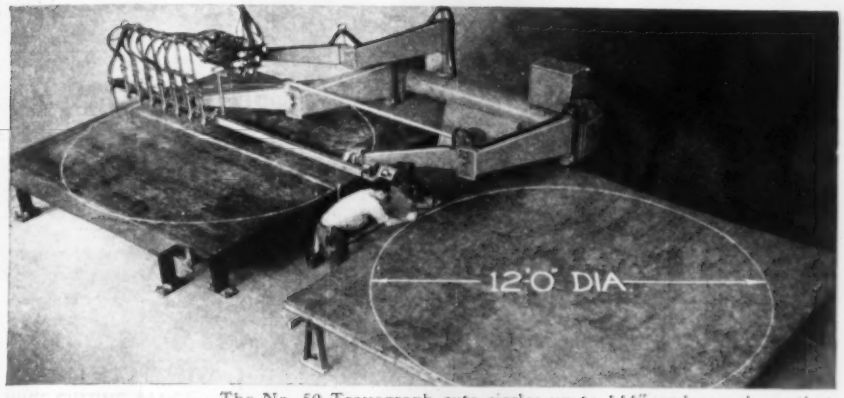
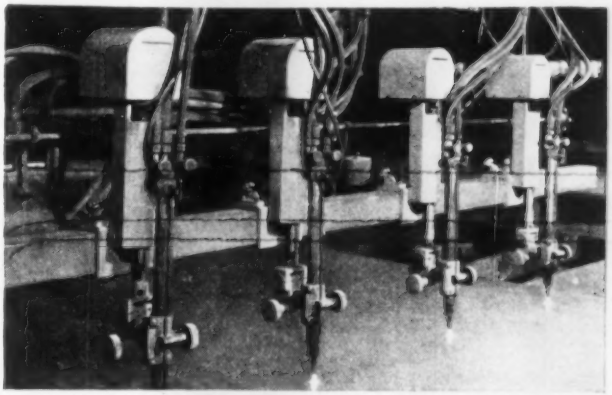
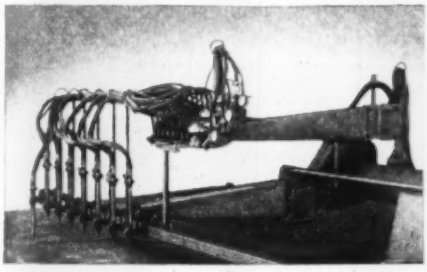


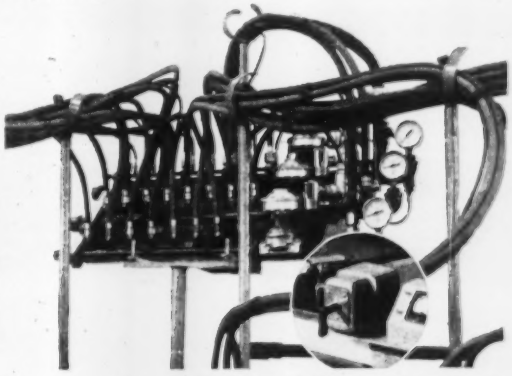
WIDE CUTTING RANGE — The No. 50 Travograph cuts circles up to 144" and any shape that does not exceed 92" x 144" on one side. Carriage speeds range from 2" to 35" per minute on the low side; 10" to 168" on the high side, permitting a wide cutting range and allowing high speed positioning over the work.



MOTORIZED TORCH HOLDER — This remote control motorized holder permits torches to be raised or lowered individually or simultaneously. Fingertip regulation by the operator allows close control of the space between the cutting tip and the material. Torches may be raised or lowered when bevel cutting without upsetting the bevel angle setting.

MANIFOLD-SUPPORTED MANIFOLD — This individual pantograph arm supports the entire weight of the gas distribution equipment, and is guided by the tracer bar, so that the manifold-torch relationship remains constant. The useful load capacity of the tracer bar is greatly increased because it carries no gas equipment except torches.





GAS DISTRIBUTION SYSTEM — A twist of the selector switch located on the remote control box at the "operator's station" gives complete control of preheating gases and cutting oxygen. This operates one to eight torches, and assures a properly adjusted flame for repetitive cutting operations. This remote control is made possible by solenoid operated valves located on the manifold.

DESIGNERS OF FLAME CUTTING MACHINES FOR EVERY PURPOSE

HALLDEN
Automatic Shears

★ FLEXIBLE DESIGN

★ CUTTING ACCURACY

★ CONTINUOUS FEED

★ RUGGED CONSTRUCTION

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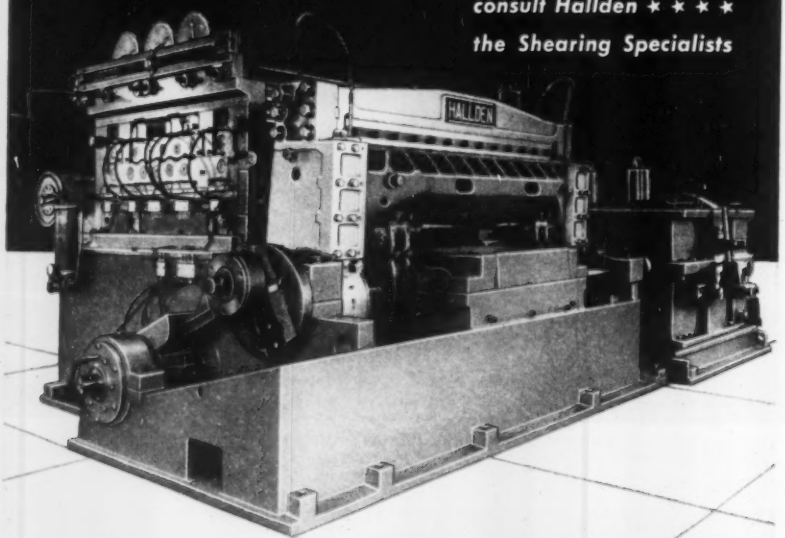
the Shearing Specialists

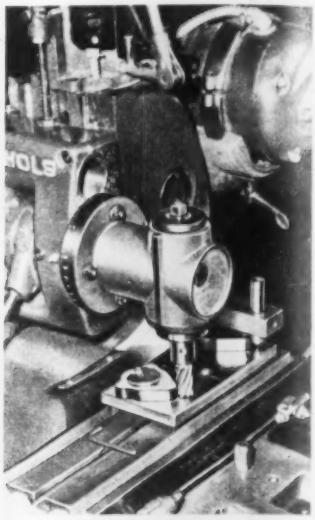


THE HALLDEN MACHINE COMPANY
THOMASTON, CONNECTICUT

Sales Representatives
The Wean Engineering Co., Inc., Warren, O. T. E. Dodds, Pittsburgh, Pa.
W. H. A. Robertson & Co., Ltd., Bedford, England

ing in a true vertical plane.

The spindle of the vertical attachment is hardened and ground with maximum allowable runout held within 0.00015-inch full indicator reading. Vertical spindle nose is identical with the horizontal spindle nose, bored No. 40 national standard taper and will interchange all tooling. A stand-

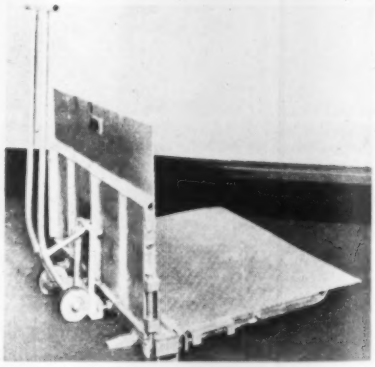


ard drawbolt is furnished and a draw-in collet attachment is available at additional cost. Attachment is driven through a splined adapter in the mouth of the horizontal spindle. Spindle speeds on a vertical attachment are a ratio of 4 to 3 with available horizontal spindle speeds.

Check No. 8 on Reply Card for more Details

Portable Ramp

One man operated ramp for both light and heavy loads is available from Superior Railway Products Corp., 512 Franklin Ave., Pittsburgh



21, Pa. The Par ramp is wheeled between locations, folds and automatically locks for convenience in handling and can be quickly positioned.

Unit is self-supported when the

PAGE WIRE

ROUND
FLAT
OR
SHAPED

LOW CARBON
HIGH CARBON
STAINLESS
SPECIAL ALLOY
ARMCO IRON

You draw the Shape —Page can draw the Wire

—the way you want it for your production—whether it's ALL of your product, or only a part.
Cross-sectional areas up to .250" square; widths to 3/8"; width-to-thickness ratio not exceeding 6 to 1.

for Wire or Information about Wire—

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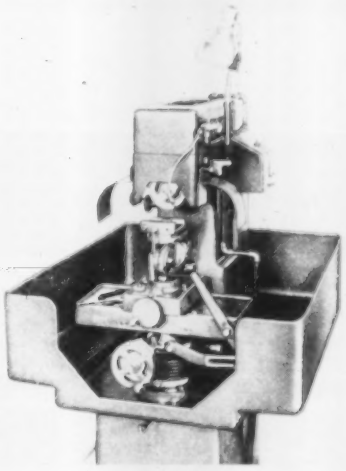
PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

leaves are vertical. When not in use only 1 x 4-foot area is required. Width is 48 inches, runway length is 60-inches. Its lip apron is 4 inches and rate of capacity is 4 tons.

Check No. 9 on Reply Card for more Details

Wet Grinder Added

Hammond Machinery Builders Inc., 1611 Douglas Ave., Kalamazoo 54, Mich., has added model CB-77W, wet combination chip breaker and diamond finishing grinder to its tool grinder line. The cup wheel side is for diamond finishing. The chip breaker side is not only for grinding chip breakers but is also designed with



the company's solid carbide insert grinding fixture. Coolant is provided by self-contained pump and tank unit, and coolant spouts can be swiveled to direct coolant to desired point.

Vibrationless grinding is provided by the machine's heavy construction in an extra heavy precision ball bearing spindle. A V-belt from a ½-hp motor in the base drives the spindle at 3150 rpm.

Check No. 10 on Reply Card for more Details

Press Piping Eliminated

Main hydraulic circuit has no piping in the metalworking presses built by Elmes Engineering Division of American Steel Foundries, Cincinnati 29, O. The only pipes in the entire press are the pilot, suction and drain lines and of these only the pilot line carries high pressure. All high-pressure fluid is conducted through short, direct passages drilled in the structural parts. As a result, there are no high-pressure screwed joints to loosen, no oil dripping from loosened fittings and no possibility of welded joints breaking loose.

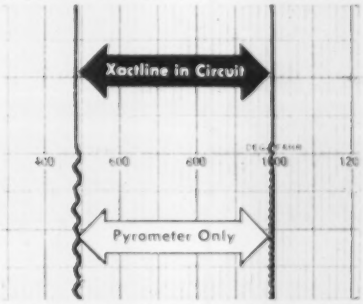
Pumping unit can be removed as a unit assembly without disconnect-

Automatic
"STRAIGHT-LINE"
TEMPERATURE CONTROL
with
XACTLINE

ELIMINATE
Overshooting
Undershooting

Are you going to continue to put up with that troublesome overshooting and undershooting inherent in your conventional pyrometer control—especially when it is so easy to eliminate that saw-tooth effect?

Put XACTLINE in the control circuit. XACTLINE anticipates the temperature changes—before they occur. And too, it nullifies the varying amounts of thermal lag, residual heat, and mechanical lag—producing a short on-off cycle resulting in "Straight-Line" temperature control. This performance is possible because there is no dependence upon mechanical parts—XACTLINE operates electrically.



Exact reproduction of temperature chart for a heating process showing the comparison of the "Straight-Line" temperature control produced by XACTLINE and the saw tooth curve obtained with only conventional control.

XACTLINE is applicable to any indicating or recording pyrometer control of the millivoltmeter or potentiometer type. It should be used wherever close temperature control is required—any type of electrically heated oven, furnace, kiln, injection molding machine, and fuel-fired furnaces equipped with motor-operated or solenoid valves.

XACTLINE is a complete unit. No adjustment or coordination with the control instrument is required regardless of the size of the furnace, length of the heating cycle, or size of the load. Installation is very simple—can be either flush or surface mounted.

PRICE **$89.50** F.O.B. CHICAGO
Nothing else to Buy

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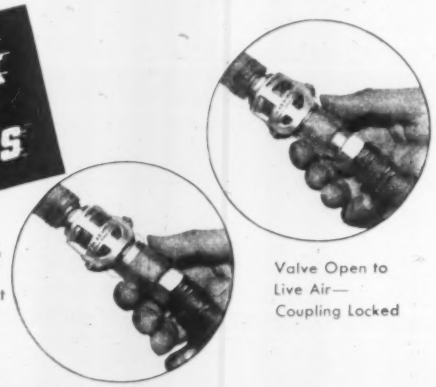
Quick-As-Wink
AIR AND HYDRAULIC
Control Valves



Valve Closed to Live Air— Open to Exhaust

Valve Open to Live Air— Coupling Locked

VALVE COUPLINGS ¼", ⅜", ½", & ¾" SIZES

For Economy and Safety

● These couplings permit air to be shut off and tools changed quickly without going to the main shut-off valve. Coupling jaws are automatically self-locking when valve is open to air supply. The coupling cannot be disconnected until the valve sleeve is moved to closed and exhaust position,—thus preventing accidents and injuries. Pressures to 250 p.s.i.—hose shank, male or female pipe connections. *Send for Bulletin No. 104-C. It gives full details and prices.*

Quick-As-Wink
AIR AND HYDRAULIC
Control Valves

Hand, Foot, Cam, Pilot, Diaphragm and Solenoid Operated

Mfd. by C. B. HUNT & SON, INC., 1926 East Pershing St., Salem, Ohio

NON-FLUID OIL
TRADE MARK REGISTERED

Means Long Life For Anti-Friction Bearings

NON-FLUID OIL is recommended by most manufacturers of anti-friction bearings because tests have proved to them that NON-FLUID OIL safeguards their bearings against pitting and wear, and assures long, trouble-free life. Leading builders of machinery, machine tools and power equipment of anti-friction bearing type have adopted NON-FLUID OIL after exhaustive service tests; they not only use it themselves but recommend it for longest life and most efficient service from their machines and bearings.

Send for instructive bulletin and free testing sample of NON-FLUID OIL.

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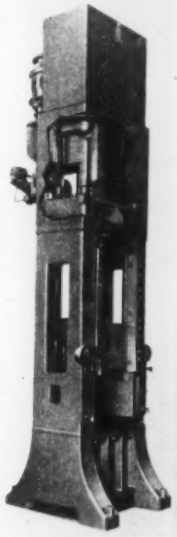
WAREHOUSES: Atlanta, Ga. ● Birmingham, Ala. ● Charlotte, N. C. ● Chicago, Ill. ● Columbus, Ga. ● Detroit, Mich. ● Greensboro, N. C. ● Greenville, S. C. ● Providence, R. I. ● St. Louis, Mo.

NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture.

ing any piping. The valve u[nit] lo-cated in the oil reservoir, is a re-movable as a unit assembly. All pumping units and valve gro[ups] fit standard bolting and drilling la[youts],

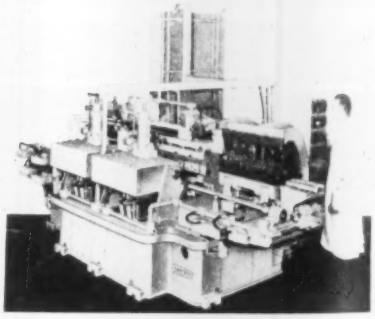


making for greater flexibility in the variety of possible pumping arrangements. Pump is supported in a heavy cast bracket flange-mounted to the press cylinder, muffling and supressing noise. Cut-away section in front of press shows the area around the cylinder barrel.

Check No. 11 on Reply Card for more Details

Five Station Transfer Machine

Special-purpose, five-station line transfer machine which drills the main bearing cap holes and drills, reams and chamfers the master dowel holes in cast iron, valve-in-head cylinder blocks is introduced by Snyder Tool & Engineering Co., 3400 E. La-



fayette, Detroit 7, Mich. This operation is automatic after loading and automatic hydraulic clamping is provided at each station. The entire operation requires but 36 seconds, giving a production ratio of 80 pieces an hour at 80 per cent efficiency. Machine may be operated by unskilled

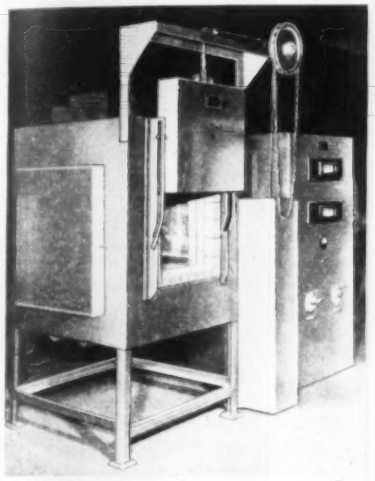
Tools are high speed steel revolving at 80 sfm with feed of 0.099 for drilling and 55 sfm with feed of 0.015 for reaming. Unit stroke is 14.25 inches.

Drive is by motors through coupling to spur gears using one 7½-hp motor for the drilling operation, one 2 hp motor for the reaming operation, and one 10 hp motor for the hydraulic unit. Indexing mechanism is hydraulic transfer type. Necessary floor space for this unit is 110x162 inches.

Check No. 12 on Reply Card for more Details

Heat Treating Furnace

Pereny Equipment Co., 893 Chambers Rd., Columbus 12, O., announces the new Pereco model FG-7800 electric furnace which has a spacious work chamber, accurate temperature



controls and versatile operating features. Furnace will handle heat-treating at temperatures up to 2500° F, and can be supplied gas-tight with atmosphere connections.

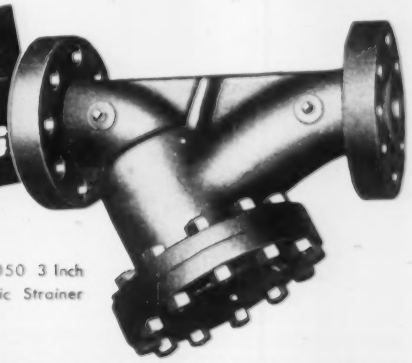
Size of model is 33¼ inches wide, 39¼ inches long, and 64 inches high with a loading area 18 inches wide, 24 inches long and 18 inches high. A chain hoist provides easy, vertical operation for the fully insulated wedge action door. Heating elements used in this furnace are the Globar silicon carbide type. Maximum connected load is 34.5 kw. Operating current is 220 v, 3-phase.

Check No. 13 on Reply Card for more Details

Gives Mirror Finish

Clair Mfg. Co. Inc., 1019 S. Union St., Olean, N. Y., announces the model 202 surface finishing machine which will finish both surfaces of flat or contoured items to any degree from flash removal to mirror finish. Designed to provide automatic float of

Quick-As-Wink AIR AND HYDRAULIC Control Valves



No. 16050 3 Inch Hydraulic Strainer

HIGH PRESSURE HYDRAULIC STRAINER to 1500 p.s.i.

protects valves, cylinders and spray nozzles

● Electric furnace cast steel housing. The strainer consists of machined and grooved bronze rings nested around a heavy slotted multi-ported bronze back-up cylinder. The rings can be loosened and cleaned easily with compressed air, or completely removed and cleaned in solvent. Repay their cost many times over. Widely used in steel mills and forging shops to prevent partial plugging of spray nozzles, resulting in rejects due to scale streaks. 1½" to 6" sizes. Send for Data Sheet No. 3402. It gives full details.

THE HIGHER THE PRESSURE THE TIGHTER THE SEAL

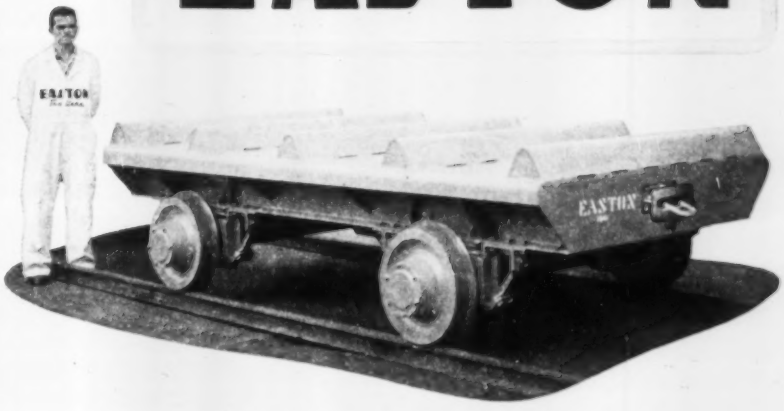
Quick-As-Wink AIR AND HYDRAULIC Control Valves

Hand, Foot, Cam, Pilot, Diaphragm and Solenoid Operated

Mfd. by C. B. HUNT & SON, INC., 1925 East Pershing St., Salem, Ohio

A-1013

EASTON

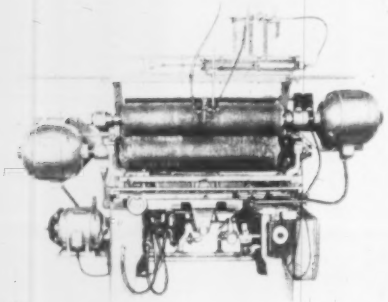


. . . a dependable design and construction service in industrial cars

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA. • NEW YORK • PHILADELPHIA • PITTSBURGH

buffs at any predetermined uniform pressure, this machine is exceptionally versatile. It is equipped with two spindles to accommodate rolls 40 inches in width and up to 9 inches in diameter.

The automatic hydraulic stroke is adjustable from ⅜ to 24 inches. A bar mounted across the front serves



to instantly open the rolls and arrest all actuation for loading or as an emergency measure. Wide variety of optional features includes choice of horsepower, variable speed controls, automatic cycling devices and numerous other modifications.

Check No. 14 on Reply Card for more Details

• • •

POLE-TOP CAPACITOR: A small pole-top packaged capacitor bank is available from Westinghouse Electric Corp., Pittsburgh 30, Pa. Equipment consists of nine 25 kva capacitor units and three solenoid-operated type CSO-1 switches. It is factory assembled, wired, tested and delivered ready to hoist into place on the crossarm. Unit is available with nine or 12 capacitors, rated 15 or 25 kva, 2400 to 7960 v.

Check No. 15 on Reply Card for more Details

SCRAP BASKET: Heavy duty scrap anode basket, made by Belke Mfg. Co., Chicago 51, Ill., is constructed of heavy gage expanded steel welded to frame of 3/16 x 1-inch steel members. Bands on sides and bottom of basket and hooks are of one continuous 3/16 x 1-inch steel piece.

Check No. 16 on Reply Card for more Details

JUNCTION BOXES: Heavy duty weatherproof junction boxes made of noncorrosive cast aluminum are available from Stone Mfg. Co., Elizabeth 4, N. J. They include a variety of covers and fittings for universal use on almost any outdoor wiring or lighting job.

Check No. 17 on Reply Card for more Details

ROTARY CUTTERS: S & E Machine Products Inc., Bridgeport, Mich., announces a new line of tungsten carbide rotary cutters. Ten shapes are offered, each in head diameters of ⅛, ¼, ⅜ and ½-in. The ⅛ and ¼-inch tools are solid tungsten carbide. Other tools are of solid tungsten carbide, butt brazed to the shanks by a special process.

Check No. 18 on Reply Card for more Details

SAFETY FOR OPERATOR: A new press type holder which allows a press operator to remove and replace the type chase without placing his hands in a dangerous position is introd
Pitt
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In
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up.

a maximum of moisture and alkali resistance.

Check No. 21 on Reply Card for more Details

TACHOMETER: Reeves Pulley Co., Columbus, Ind., has developed a new electric tachometer for use with their variable speed transmissions and Vari-Speed Motodrives. It operates on the alternating generator principle. The indicator may be mounted as far as 300 feet from the variable speed drive.

Check No. 22 on Reply Card for more Details

THREE-WAY VALVE: Suited for heavy duty service on construction and materials handling machinery, the new hydraulic valve offered by Parker Appliance Co., Cleveland 12, O., operates at pressures up to 2000 psi. It features an externally adjustable, built-in, balanced relief valve sized to handle full pump capacity up to 14 gallons per minute. Cylinder and pressure ports are available in ¼, ⅜ or ½-inch internal pipe thread size while return port is sized at ¾-inch.

Check No. 23 on Reply Card for more Details

CERAMIC CAPACITORS: Ceramite disk capacitors with voltage ratings as high as 1500 v are among the line of ceramic capacitors including temperature-compensating, general application and high-K types available from Sprague Electric Co., North Adams, Mass.

TYP

CUT-

announced by Schori Process Division, Ferro-Co Corp., Long Island City 1, N. Y. It will handle materials that are stable in themselves but cure quickly only when mixed with other materials. The unit uses two pots and a spray gun with two nozzles. This keeps the two solutions apart until they are mixed externally as the material is atomized.

Check No. 27 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

75. Hydraulic Testing Machines

Tinius Olsen Testing Machine Co.—8-page illustrated bulletin 40 describes Super L line of hydraulic testing machines for tension, compression, transverse and flexure testing. Machines are available with three ranges in capacities from 60,000 to 400,000 lb. Also included is information on Olsen electronic recorder with 100 to 1 spread of ranges.

76. Industrial Sites

Barton Trading Corp.—28-page il- ... bulletin "Harborside Park"

82. Beam Scale Attachment

Howe Scale Co.—4-page illustrated folder form 668 presents features of Howe 77 Weightograph which is attached to any beam scale or to any scale convertible to beam operation. It makes scale "automatic". Weight is read in large illuminated graduations and figures.

83. Structural Steel

American Institute of Steel Construction, Inc. — 8-page illustrated bulletin "Fabricated Structural Steel" shows typical bridges and buildings

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85. Scale Prevention

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Angier Corp.—12-page illustrated bulletin "The New Method of Rust Prevention" describes VPI Wrap as noncorrosive paper which incorporates inhibitor that vaporizes slowly to prevent rusting of products which are wrapped in it. Packaging procedures for various conditions are outlined.

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TION **USE ONE OF THESE CARDS . .**

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duction line set-ups.

80. Cast Steels

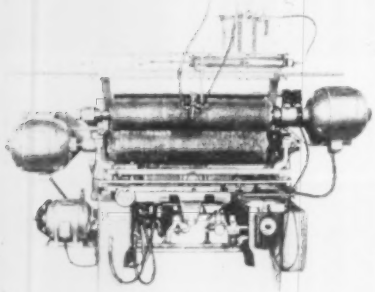
Lunkenheimer Co.—52-page brochure describes in nontechnical manner Lunkenheimer cast steels, their manufacture, properties and applications. Information is presented to assist valve user in knowing inherent qualities of steels employed in steel valve construction.

81. Cutting Tools

Scully-Jones & Co.—8-page illustrated bulletin No. 5-50 details advantages, uses and specifications of counterbore cutters, countersinks, counterbore pilots and drivers and core drill holders and cutters.

buffs at any predetermined uniform pressure, this machine is exceptionally versatile. It is equipped with two spindles to accommodate rolls 40 inches in width and up to 9 inches in diameter.

The automatic hydraulic stroke is adjustable from ⅜ to 24 inches. A bar mounted across the front serves



to instantly open the rolls and arrest all actuation for loading or as an emergency measure. Wide variety of optional features includes choice of horsepower, variable speed controls, automatic cycling devices and numerous other modifications.

Check No. 14 on Reply Card for more Details

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POLE-TOP CAPACITOR: A small pole-top packaged capacitor bank is available from Westinghouse Electric Corp., Pittsburgh 30, Pa. Equipment consists of nine 25-kva capacitor units and three solenoid-operated type CSO-1 switches. It is factory assembled, wired, tested and delivered ready to hoist into place on the crossarm. Unit is available with nine or 12 capacitors, rated 15 or 25 kva, 2400 to 7960 v.

Check No. 15 on Reply Card for more Details

SCRAP BASKET: Heavy duty scrap anode basket, made by Belke Mfg. Co., Chicago 51, Ill., is constructed of heavy gage expanded steel welded to frame of 3/16 x 1-inch steel members. Bands on sides and bottom of basket and hooks are of one continuous 3/16 x 1-inch steel piece.

Check No. 16 on Reply Card for more Details

JUNCTION BOXES: Heavy duty weatherproof junction boxes made of noncorrosive cast aluminum are available from Stone Mfg. Co., Elizabeth 4, N. J. They include a variety of covers and fittings for universal use on almost any outdoor wiring or lighting job.

Check No. 17 on Reply Card for more Details

ROTARY CUTTERS: S & E Machine Products Inc., Bridgeport, Mich., announces a new line of tungsten carbide rotary cutters. Ten shapes are offered, each in head diameters of ⅛, ¼, ⅜ and ½-in. The ⅛ and ¼-inch tools are solid tungsten carbide. Other tools are of solid tungsten carbide, butt brazed to the shanks by a special process.

Check No. 18 on Reply Card for more Details

SAFETY FOR OPERATOR: A new press type holder which allows a press operator to remove and replace the type chase without placing his hands in a dangerous position is introduced by M. E. Cunningham Co., Pittsburgh 3, Pa. Designated as model PH-50, the device includes a removable type chase and a shank with a yoke-shaped outer frame. Shank can be made any size for fitting individual press requirements.

Check No. 19 on Reply Card for more Details

NO MOISTURE: Wax S-1167, developed by Glyco Products Co. Inc., Brooklyn 2, N. Y., protects electrical components such as coils from moisture to prevent shorting out. It is a completely synthetic dark organic wax with a ball and ring melting point of 120-125° C and a flash point higher than 250° C. It is tough, nonbrittle and does not tend to become very brittle at low temperatures.

Check No. 20 on Reply Card for more Details

PROTECTIVE PAINT: Metyl-Pro, developed by John W. Masury & Son Inc., Baltimore 30, Md., is a basic red lead prime with zinc chromate. Therefore, if there should be a break in the red lead film, chromate ions are liberated over the break to protect metal until the area is touched up. Vehicle is phenolic which has a maximum of moisture and alkali resistance.

Check No. 21 on Reply Card for more Details

TACHOMETER: Reeves Pulley Co., Columbus, Ind., has developed a new electric tachometer for use with their variable speed transmissions and Vari-Speed Motodrives. It operates on the alternating generator principle. The indicator may be mounted as far as 300 feet from the variable speed drive.

Check No. 22 on Reply Card for more Details

THREE-WAY VALVE: Suited for heavy duty service on construction and materials handling machinery, the new hydraulic valve offered by Parker Appliance Co., Cleveland 12, O., operates at pressures up to 2000 psi. It features an externally adjustable, built-in, balanced relief valve sized to handle full pump capacity up to 14 gallons per minute. Cylinder and pressure ports are available in ¼, ⅜ or ½-inch internal pipe thread size while return port is sized at ¾-inch.

Check No. 23 on Reply Card for more Details

CERAMIC CAPACITORS: Ceramite disk capacitors with voltage ratings as high as 1500 v are among the line of ceramic capacitors including temperature-compensating, general application and high-K types available from Sprague Electric Co., North Adams, Mass.

Check No. 24 on Reply Card for more Details

NO SEIZING: Known as Led-Plate, an antiseize compound that combines the advantages of a lubricant and sealer is introduced by Armite Laboratories, Los Angeles 1, Calif. It gives effective results when used in temperatures from minus 350° F to plus 2900° F. The compound can be used for steam, gas, water, air, oil, ammonia and various chemical connections.

Check No. 25 on Reply Card for more Details

REMOVES CONTAMINANTS: Magnus Chemical Co. Inc., Garwood, N. J., offers the Emulso clean process for removing contaminants resulting from metal processing operations. It utilizes Magnusol, an emulsion cleaner that is a neutral, oil and water soluble penetrating agent and is noninflammable at working temperature. Work to be cleaned may be dipped or sprayed.

Check No. 26 on Reply Card for more Details

SPRAYS TWO SOLUTIONS: A new paint type spray gun that sprays two solutions at the same time is announced by Schori Process Division, Ferro-Co Corp., Long Island City 1, N. Y. It will handle materials that are stable in themselves but cure quickly only when mixed with other materials. The unit uses two pots and a spray gun with two nozzles. This keeps the two solutions apart until they are mixed externally as the material is atomized.

Check No. 27 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

75. Hydraulic Testing Machines

Tinius Olsen Testing Machine Co.—8-page illustrated bulletin 40 describes Super L line of hydraulic testing machines for tension, compression, transverse and flexure testing. Machines are available with three ranges in capacities from 60,000 to 400,000 lb. Also included is information on Olsen electronic recorder with 100 to 1 spread of ranges.

76. Industrial Sites

Barton Trading Corp.—28-page illustrated bulletin "Harborside Park" discusses advantages offered by this industrial area which is being developed in Providence, R. I. Site offers modern one and two-story buildings designed for efficient straight-line production for immediate lease. Information is included on shipping and handling facilities, living conditions, labor availability, etc.

77. Pinions & Gears

General Electric Co.—8-page illustrated bulletin GEA-1054B deals with broad assortment of pinions and gears for railroad, urban transit and industrial haulage equipment. Manufacturing facilities, ordering procedures and gear sales outlets are covered.

78. Press Safety Guard

Hoffman Engineering Corp.—4-page illustrated bulletin "Save Those Hands" explains how electronic controlled safety guard operates and how it is applied to various types of positive and friction clutch power presses. This barrier gate type guard is fully automatic.

79. Polishing & Buffing

Murray-Way Corp.—4-page illustrated bulletin "Polishing and Buffing Equipment" shows and briefly describes typical machines developed for polishing, buffing and grinding products automatically and on production line set-ups.

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82. Beam Scale Attachment

Howe Scale Co.—4-page illustrated folder form 668 presents features of Howe 77 Weightograph which is attached to any beam scale or to any scale convertible to beam operation. It makes scale "automatic". Weight is read in large illuminated graduations and figures.

83. Structural Steel

American Institute of Steel Construction, Inc. — 8-page illustrated bulletin "Fabricated Structural Steel" shows typical bridges and buildings which employ structural steel. Advantages of steel construction are listed. Details are given on motion pictures and books which deal with structural steel.

84. Drainage Pipe

Armco Drainage & Metal Products, Inc.—6-page illustrated folder PA-9850 shows design of Pipe-Arch and Multi-Plate Pipe-Arch drainage pipes which carry more water than equivalent sizes of round pipe and are particularly adaptable for service where headroom is limited. Tables give recommended sizes and gages to meet various loading conditions.

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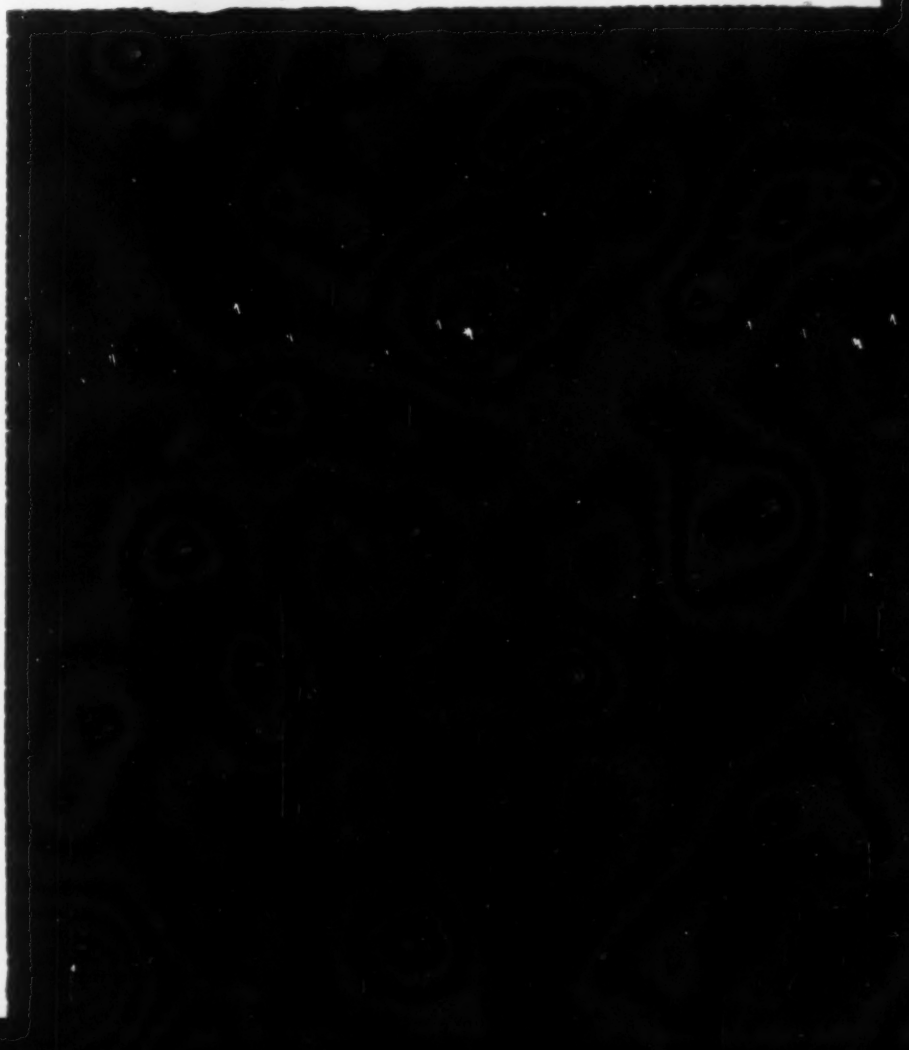


HELPFUL LITERATURE

88. Barrel Finishing

Queen City Stove Works, Almco Div. — 20-page illustrated treatise "Advanced Barrel Finishing" discusses range of application of Supersheen technique which employs infinitely variable speed octagonal tumbling barrel and predetermined amounts of abrasives and compounds with water or other fluid. Work is rotated at set rate of speed for selected time to obtain any desired finish.

89. Printing Calculator

Remington Rand, Inc.—12-page illustrated bulletin AD515 discusses applications of Printing Calculator which is ten-key machine that permits high speed addition, subtraction, multiplication and division and produces printed record which facilitates checking. Various types of accounting and other transactions are demonstrated with examples.

90. Lock Nut

Grip Nut Co.—4-page illustrated bulletin "Gripco Lock Nut" gives dimensions, list prices and other data on American Standard heavy, regular and light nuts. Double triangle grip design assures sustained holding power and permits reuse many times.

91. Copper Base Alloys

Lunkenheimer Co.—15-page illustrated brochure describes company's copper base alloys, their manufacture, properties and general application. Most extensively used in valve construction, alloys combine corrosion and temperature resistance at relatively low first cost.

92. Vibration Isolation

Felters Co. — 16-page illustrated booklet "Unisorb" describes how this material simplifies anchoring of machines on all types of floors and controls transmitted vibration and noise. Use of cemented pads for mounting textile, air conditioning and other machines; compressors and pumps; machine tools and many other types of equipment are described.

93. Cold Headed Fasteners

John Hassall, Inc.—34-page illustrated catalog No. 60 explains savings in operations and materials costs resulting from use of cold headed fasteners. It illustrates variety of cold headed nails, rivets, screws and other specialties available. Considerable weight and dimensional data are included along with descriptions of each type of fastener and metal, packaging and plating information.

94. Strain Gages

Baldwin-Lima-Hamilton Corp.—2-page illustrated bulletin No. 174 describes and gives graphic performance and specifications for ten new type SR-4 resistance wire strain gages. They are only slightly affected by temperature variations within certain ranges when bonded to steel or aluminum.

95. Electronic Air Cleaner

Westinghouse Electric Corp., Sturtevant Div.—8-page leaflet SA-6691 uses nontechnical language to describe Precipitron electronic air cleaning units for stores, offices and factories. How it operates, why it cleans so effectively, where it can be used to advantage and kind of unit to select are covered.

96. Hydraulic Press

American Broach & Machine Co.—4-page illustrated bulletin 206 describes 6 and 12 ton presses which are adaptable for surface and internal push-down broaching as well as for arbor press and assembly operations. Typical applications of these machines are covered.

97. Aluminum Finishing

American Chemical Paint Co.—4-page illustrated form 586B discusses Alodizing of aluminum and its alloys to impart amorphous phosphate coating which protects metal and affords good bond for paint. Alodized surfaces are obtained by immersion, brushing or spraying products in multistage power washer.

98. Heat Treating

Surface Combustion Corp.—8-page illustrated publication "Heat Treat Review" contains articles on gas carburizing furnaces, their design and operation. Also covered are depreciation allowances, continuous heat treating of automotive parts and high speed heating of forged automobile parts.

99. Grinding Machines

Niles-Bement-Pond Co. Pratt & Whitney Div.—4-page illustrated circular No. 529-1 is descriptive of 16 x 24-in. vertical die and surface grinders for close-quarter work and 36 x 42-in. model for larger areas. Machines will produce surface finishes of 2 micro inches or better on carbide dies.

100. Automatic Spray Gun

DeVilbiss Co.—4-page illustrated form IE-C-104-A explains features of type AGA automatic spray gun for all types of finishing operations. Gun can be mounted easily on any type of machine or fixture and features instant response to timing controls

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

The Market Outlook

OPEN-END Controlled Materials Plan on steel, copper and aluminum, just announced to become operative July 1, will prove no cure-all for the steel supply difficulties of the overall general metalworking industry. Scramble among nonparticipating or unrated consumers for the leftover tonnage after defense needs are met is bound to be just about as hectic as it is under the present overloaded priority system.* Many steel authorities believe complete control preferable; that in the absence of such the new method offers little more toward solving the overall supply problem than the present unwieldy distribution system of priorities, directives and allocations.

BALANCE—Generally, even a limited CMP is seen as a forward step. Predictions are that before the plan becomes effective, revisions, possibly enlargement of the plan's scope, will be found advisable. Closer balancing of defense and defense-supporting requirements with available supplies is viewed as constructive. Further, the new method of caring for defense requirements comes just at a time when the priority system is giving signs of breaking down under its own weight with defense orders piling up on mill books to the point priority ratings threaten to become meaningless. In addition, balancing of supplies with defense demand may prevent excessive and unnecessary accumulations of stocks at defense plants, thus releasing some tonnage to the general market which otherwise might be frozen in stock.

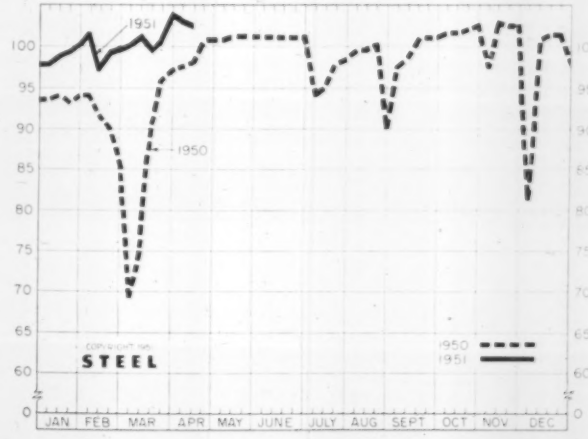
PRODUCTION—The steel mills continue to turn out more than 2 million tons of ingots weekly. Last week the national ingot rate eased ½ point to 102.5 per cent of capacity.

DEMAND—Defense requirements for steel have taken another spurt. This is reflected in mill schedules for June. DO set-aside tonnages generally are larger on the various products and more tonnage is allocated for directive programs. It is estimated that close to 55 per cent of the steel industry's production will go into defense and defense supporting lines of consumption during the month. A further reflection of the extent of emergency needs is seen in the forward edging of delivery promises on DO-rated work.

DELIVERIES—Despite the recent increases in minimum mill product set-asides, delivery promises on most defense tonnage are further extended than ever. This, in part, is due to the fact much of the increase in mill quotas for June goes to meet the requirements of agricultural implement manufacturers. Also, the needs of manufacturers of certain types of construction equipment are being covered under a DO rating just set up. This heavier defense load on the mills means further cutbacks in supplies for the civilian goods manufacturer, cutbacks which now are being mirrored in production curtailments and employment dislocations on a widening scale.

PRICES—Office of Price Stabilization is expected to issue soon regulations covering sale of steel products by warehouses and resellers. Ceiling prices, it is understood, will be established for the separate sellers based on their average monthly product cost, including freight and mill extras, plus a percentage markup. Ceilings for sellers of secondary products and imported steel will be determined on a basis differing somewhat from that for prime products, and prevention of overpricing by resellers will be sought. Some 19 changes in the scrap price schedule also are reported under consideration, including amendments aimed at eliminating upgrading, and changes affecting water and rail-water shipments. Otherwise the pricing situation in the steel and related markets is placid. STEEL's composites are steady with the weighted index on finished steel holding at 171.92, the finished steel arithmetical composite at $106.32, No. 2 foundry pig iron, $52.54, basic, $52.16, malleable, $53.27, and steelmaking scrap, $44.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Apr. 14	Change	Same Week 1950	Same Week 1949
Pittsburgh	102	— 0.5*	101	98
Chicago	105	— 1.5*	105	100
Mid-Atlantic	100.5	0	93	94
Youngstown	104	0	105	105
Wheeling	94.5	— 1.5	102.5	95.5
Cleveland	101.5	+ 3	99.5	100.5
Buffalo	104	0	104	104
Birmingham	100	0	100	100
New England	89	+ 2	87	88
Cincinnati	102	— 4	102	104
St. Louis	92.5	+ 2	84.5	84.5
Detroit	103.5	0	102	110
Western	107	+ 1	95	101.5
Estimated national rate	102.5	— 0.5	98	99

Based on weekly steelmaking capacity of 1,999,634 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

*Change from revised rate for preceding week.

Composite Market Averages

	Apr. 12 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	171.92	171.92	171.92	156.13	111.62
Index in cents per lb.	4.657	4.657	4.657	4.230	3.024
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$106.32	$106.32	$106.32	$93.18	$63.54
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	46.47	26.17
Basic Pig Iron, GT	52.16	52.16	52.16	45.97	25.50
Malleable Pig Iron, GT	53.27	53.27	53.27	47.27	26.79
Steelmaking Scrap, GT	44.00	44.00	44.00	29.08	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Apr. 12 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R., del. Philadelphia	4.20	4.20	4.18	3.93	2.82
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.10–15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia	3.91	3.91	3.90	3.46	2.465
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.60	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.60	2.50
Sheets, H.R., Pittsburgh	3.60–75	3.60–75	3.60–75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh	3.75–4.00	3.75–4.00	3.75–4.00	3.25	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65–5.35	4.65–5.35	4.65–5.35	4.15	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.35–5.60	4.35–5.60	4.35–5.60	4.35–40	3.15
Wire, Basic, Pittsburgh	4.85–5.10	4.85–5.10	4.85–5.10	4.50	3.05
Nails, Wire, Pittsburgh	5.90–6.20	5.90–6.20	5.90–6.20	5.30	3.25
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, 5/32-9/32", Pitts.	4.10-30	4.10-30	4.10-30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47.00	$27.00
Basic, Valley	52.00	52.00	52.00	46.00	26.00
Basic, del. Phila.	56.49	56.49	56.39	49.44	27.84
No. 2 Fdry, Pitts.	52.50	52.50	52.50	46.50	26.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	46.50	26.50
No. 2 Fdry, Valley	52.50	52.50	52.50	46.50	26.50
No. 2 Fdry, Del. Phila.	56.99	56.99	56.89	49.94	28.34
No. 2 Fdry, Birm.	48.88	48.88	48.88	42.38	22.88
No. 2 Fdry (Birm. del. Cin.	55.33	55.33	55.58	49.08	26.56
Malleable Valley	52.50	52.50	52.50	46.50	26.50
Malleable, Chicago	52.50	52.50	52.50	46.50	26.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	60.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt. Pitts.	$45.00	$45.00	$45.00	$32.25	$20.00
No. 1 Heavy Melt. E. Pa.	43.50	43.50	43.50	26.00	18.75
No. 1 Heavy Melt. Chicago	43.50	43.50	43.50	29.00	18.75
No. 1 Heavy Melt. Valley	45.00	45.00	45.00	32.75	20.00
No. 1 Heavy Melt. Cleve.	44.00	44.00	44.00	29.25	19.50
No. 1 Heavy Melt. Buffalo	44.00	44.00	44.00	29.75	19.25
Rails, Rerolling, Chicago	52.50	52.50	52.50	46.50	22.25
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	41.00	20.00

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn., Connlsvl.	$14.75	$14.75	$14.75	$14.25	$7.50
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	16.00	8.25
Oven Fdry., Chicago	21.00	21.00	21.00	21.00	13.00

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	18.50	12.00
Zinc, E. St. Louis	17.50	17.50	17.50	10.50	8.25
Lead, St. Louis	16.80	16.80	16.80	10.30	6.35
Tin, New York	147.00	149.875	134.00	76.00	52.00
Aluminum, del.	19.00	19.00	19.00	17.00	15.00
Antimony, Laredo, Tex.	42.00	42.00	42.00	24.50	14.50
Nickel, refinery, duty paid	50.50	50.50	50.50	40.00	35.00

Pig Iron

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices do not include 3% federal tax producing companies published on second following page

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$ 59
Brooklyn, N.Y., del.	....	58.96	59.46	
Newark, del.	56.74	57.24	57.74	24
Philadelphia, del.	56.49	56.99	57.49	96
Birmingham District				
Alabama City, Ala. R2	48.38	48.88	....	
Birmingham R2	48.38	48.88	....	
Birmingham S9	48.38	48.88	....	
Woodward, Ala. W15	48.38	48.88	....	
Cincinnati, del.	....	55.33	....	
Buffalo District				
Buffalo R2	52.00	52.50	53.00	
Buffalo H1	52.00	52.50	53.00	
Tonawanda, N.Y. W12	52.00	52.50	53.00	
No. Tonawanda, N.Y. T9	....	52.50	53.00	
Boston, del.	61.63	62.13	62.63	
Rochester, N.Y., del.	54.74	55.24	55.74	
Syracuse, N.Y., del.	55.72	56.22	56.72	
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	
Indiana Harbor, Ind. I-2	52.00	....	52.50	
So. Chicago, Ill. W14	52.00	52.50	52.50	
So. Chicago, Ill. Y1	52.00	52.50	52.50	
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	53.97	54.47	54.47	54.97
Muskegon, Mich., del.	....	58.20	58.20	
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	
Akron, del. from Cleve.	54.49	54.99	54.99	55.49
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	51.75	52.25	
Fontana, Calif. K1	58.00	58.50	....	
Geneva, Utah G1	52.00	52.50	....	
Seattle, Tacoma, Wash., del.	....	60.35	....	
Portland, Oreg., del.	....	60.35	....	
Los Angeles, San Francisco, del.	59.85	60.35	....	
Granite City Ill. G4	53.90	54.40	54.90	
St. Louis, del. (inc. tax)	54.66	55.16	55.66	
Ironton, Utah C11	52.00	52.50	....	
Lone Star, Tex. L6	48.00	*48.50	48.50	
Minnequa, Colo. C10	54.00	55.00	55.00	
Pittsburgh District				
Neville Island, Pa. P6	....	52.50	52.50	53.00
Pitts., N & S. sides, Ambridge, Aliquippa, del.	....	53.74	53.74	54.24
McKees Rocks, del.	....	53.49	53.49	53.99
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.00	54.00	54.50
Verona, del.	....	54.48	54.48	54.98
Brackenridge, del.	....	54.72	54.72	55.22
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.21	57.71	....	
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	
Youngstown Y1	52.00	52.50	52.50	
Youngstown U5	52.00	....	....	53.00
Mansfield, O., del.	56.43	56.93	56.93	57.43

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$83.00
Keokuk, Iowa, Openhearth & Fdry. frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia delivered	63.12
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Basing prices quoted under GCPR as reported to STEEL, Apr. 12, 1951; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ...$79.00
Munhall,Pa. U5 .....52.00

INGOTS, Alloy (NT)
Bridgeville,Pa. R7 .....$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 .....62.00
Midland,Pa. C18 .....54.00
Munhall,Pa. U5 .....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 .....56.00
Ensley,Ala. T2 .....56.00
Fairfield,Ala. T2 ....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 .....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y. B2 ..56.00
Munhall,Pa. U5 .....56.00
So.Chicago,Ill. U5 ...56.00
So.Duquesne,Pa. U5 ..56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 .....66.00
Canton,O. R2 .....66.00
Clairton,Pa. U5 .....66.00
Cleveland R2 .....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 .....69.00
Ensley,Ala. T2 .....66.00
Fairfield,Ala. T2 ....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 .....66.00
Geneva,Utah G1 .....66.00
Houston,Tex. S5 .....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2..66.00
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....66.00
Seattle B3 .....85.00
So.Chicago R2, U5, W14.66.00
So.Duquesne,Pa. U5 ...66.00
So.SanFrancisco B3 ...85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 .....70.00
Canton,O. R2 .....70.00
Canton,O.(29) T7 ....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 .....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 .....70.00
Houston,Tex. S5 .....78.00
Ind.Harbor,Ind. Y1 ...70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2..70.00
LosAngeles B3 .....90.00
Massillon,O. R2 .....70.00
Midland,Pa. C18 .....70.00
Munhall,Pa. U5 .....70.00
So.Chicago R2,U5,W14.70.00
So.Duquesne,Pa. U5 ...70.00
Struthers,O. Y1 .....70.00
Warren,O. C17 .....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$82.00
Cleveland R2 .....82.00
Fontana,Calif. K1 ...103.00
Gary,Ind. U5 .....82.00
Massillon,O. R2 .....82.00
So.Chicago,Ill. R2 ....82.00
So.Duquesne,Pa. U5 ..82.00

SHEET BARS (NT)
Fontana,Calif. K1 ...$89.00

SKELP
Aliquippa,Pa. J5 .....3.45
Munhall,Pa. U5 .....3.35
Warren,O. R2 .....3.35
Youngstown R2, U5 ...3.35

WIRE RODS
AlabamaCity,Ala. R2 ..4.10
Buffalo W12 .....4.10
Cleveland A7 .....4.10
Donora,Pa. A7 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.90
Houston,Tex. S5 .....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 .....4.10
LosAngeles B3 .....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 .....4.30
No.Tonawanda,N.Y.B11 ..4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 .....4.20
So.Chicago,Ill. R2 .....4.10
SparrowsPoint,Md. B2 ..4.20
Sterling,Ill.(1) N15 ...4.10
Struthers,O. Y1 .....4.10
Torrance,Calif. C11 ...4.90
Worcester A7 .....4.40

PLATES, Wrought Iron
Economy,Pa. B14 .....8.60

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..3.60
Aliquippa,Pa. J5 .....3.65
Bessemer,Ala. T2 .....3.65
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fairfield,Ala. T2 .....3.65
Fontana,Calif. K1 .....4.25
Gary,Ind. U5 .....3.65
Geneva,Utah G1 .....3.65
Houston,Tex. S5 .....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 .....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....4.95
Portland,Oreg. O4 .....4.50
Seattle B3 .....4.30
So.Chicago,Ill. U5, W14.3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 .....4.35
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 .....4.35
So.Chicago,Ill. U5 .....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....5.50
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.10
Gary,Ind. U5 .....5.50
Geneva,Utah G1 .....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y1 ....6.00
Johnstown,Pa. B2 .....5.50
Lackawanna,N.Y.(14)B2 5.50
LosAngeles B3 .....6.05
Munhall,Pa. U5 .....5.50
Seattle B3 .....6.10
So.Chicago,Ill. U5 .....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 .....6.00

Wide Flange
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fontana,Calif. K1 .....4.65
Lackawanna,N.Y. B2 ..3.70
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....5.50
Lackawanna,N.Y. B2 ..5.50
Munhall,Pa. U5 .....5.45
So.Chicago,Ill. U5 .....5.45

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ..4.45
Munhall,Pa. U5 .....4.45
So.Chicago,Ill. U5 .....4.45

BEARING PILES
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.65
Bessemer,Ala. T2 .....5.65
Clairton,Pa. U5 .....5.65
Cleveland J5, R2 .....5.65
Conshohocken,Pa. A3 ..5.90
Fairfield,Ala. T2 .....5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 .....5.65
Geneva,Utah G1 .....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 ....6.15
Johnstown,Pa. B2 .....5.65
Munhall,Pa. U5 .....5.65
Pittsburgh J5 .....5.65
Seattle B3 .....6.55
Sharon,Pa. S3 .....5.70
So.Chicago,Ill. U5 .....5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 .....5.65
Youngstown Y1 .....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..5.05
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 .....4.75
Johnstown,Pa. B2 .....4.75
Munhall,Pa. U5 .....4.75
Sharon,Pa. S3 .....5.20
So.Chicago,Ill. U5 .....4.75
SparrowsPoint,Md. B2 ..4.75

FLOOR PLATES
Cleveland J5 .....4.75
Conshohocken,Pa. A3 ..4.75
Harrisburg,Pa. C5 ....5.95
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 .....4.75
So.Chicago,Ill. U5 .....4.75

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Ashland,Ky.(15) A10 ..3.70
Bessemer,Ala. T2 .....3.70
Clairton,Pa. U5 .....3.70
Claymont,Del. C22 .....4.15
Cleveland J5, R2 .....3.70
Coatesville,Pa. L7 .....4.15
Conshohocken,Pa. A3 ..4.15
Fairfield,Ala. T2 .....3.70
Fontana,Calif.(30) K1 ..4.30
Gary,Ind. U5 .....3.70
GraniteCity,Ill. G4 ....4.40
Geneva,Utah G1 .....3.70
Harrisburg,Pa. C5 .....4.95
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ..3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 .....3.70
Pittsburgh J5 .....3.70
Seattle B3 .....4.60
Sharon,Pa. S3 .....3.95
So.Chicago,Ill. U5, W14.3.70
SparrowsPoint,Md. B2 ..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 .....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1.3.70

PLATES, Carbon A. R.
Fontana,Calif. K1 ....5.45
Geneva,Utah G1 .....4.85

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ...3.95
Asfiland,lcl.(15) A10 ...4.45
Cleveland,c.l. R2 .....4.30
Warren,O. c.l. R2 .....4.30

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Alton,Ill.(1) L1 .....3.95
Atlanta,Ga. A11 .....4.25
Bessemer,Ala. T2 .....3.70
Buffalo R2 .....3.70
Canton,O. R2 .....3.70
Clairton,Pa. U5 .....3.70
Cleveland R2 .....3.70
Detroit R7 .....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 .....5.05
N.Tonawanda,N.Y. B11.3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 .....4.65
Seattle B3, N14 .....4.45
So.Chicago R2, U5, W14.3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
Youngstown R2, U5 ...3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....3.70
Atlanta A11 .....4.25
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ..3.70
Niles,Calif. P1 .....5.05
Portland,Oreg. O4 .....4.65
SanFrancisco S7 .....4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 .....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.30
Canton,O.(29) T7 .....3.95
Clairton,Pa. U5 .....4.30
Detroit R7 .....4.45
Ecorse,Mich. G5 .....4.65
Fontana,Calif. K1 .....5.35
Gary,Ind. U5 .....4.30
Houston,Tex. S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.30
Midland,Pa. C18 .....4.30
So.Chicago R2, U5, W14.4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 .....4.30
Warren,O. C17 .....4.30
Youngstown U5 .....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....4.55
Gary,Ind. U5 .....4.55
Youngstown U5 .....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.55
Bessemer,Ala. T2 .....5.55
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.55
Cleveland R2 .....5.55
Fairfield,Ala. T2 .....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1..6.05
Johnstown,Pa. B2 .....5.55
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.25
Pittsburgh J5 .....5.55
Seattle B3 .....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 .....6.00
Youngstown U5 .....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....4.55
BeaverFalls,Pa.M12,R2 ..4.55
Buffalo B5 .....4.60
Camden,N.J. P13 .....5.00
Carnegie,Pa. C12 .....4.55
Chicago W18 .....4.55
Cleveland A7, C20 .....4.55
Detroit P17 .....4.70
Donora,Pa. A7 .....4.55
Elyria,O. W8 .....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 .....4.55
GreenBay,Wis. F7 .....4.55
Hammond,Ind. L2, M13..4.55
Hartford,Conn. R2 .....5.10
Harvey,Ill. B5 .....4.55
LosAngeles R2 .....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca,Pa. S17 .....4.55
Newark,N.J. W18 .....5.00
Plymouth,Mich. P5 .....4.80
Pittsburgh J5 .....4.55
Putnam,Conn. W18 .....5.10
Readville,Mass. C14 .....5.10
St.Louis,Mo. M5 .....4.95
So.Chicago,Ill. W14 .....4.55
SpringCity,Pa.(5) K3 ....5.00
Struthers,O. Y1 .....4.55
Waukegan,Ill. A7 .....4.55
Youngstown F3, Y1 .....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 .....5.40
Buffalo B5 .....5.40
Camden,N.J. P13 .....5.50
Canton,O. R2 .....5.40
Canton,O.(29) T7 .....4.90
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7 .....5.45
Cleveland C20 .....5.40
Detroit P17 .....5.55
Donora,Pa. A7 .....5.45
Elyria,O. W8 .....5.40
Gary,Ind. R2 .....5.40
Hammond,Ind. L2, M13..5.40
Hartford,Conn. R2 .....5.85
Harvey,Ill. B5 .....5.40
Lackawanna,N.Y. B2 ....5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.75
Plymouth,Mich. P5 .....5.60
So.Chicago,Ill. R2, W14.5.40
Struthers,O. Y1 .....5.40
Warren,O. C17 .....5.40
Waukegan,Ill. A7 .....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 .....5.40

RAIL STEEL BARS
ChicagoHts.(3,4)I-2, C2..4.75
Franklin,Pa.(3, 4) F5 ...4.75
FortWorth,Tex.(26) T4 ..4.85
Huntngtn,W.Va.(3) W7 ...5.50
Marion,O.(3) P11 .....4.75
Moline,Ill.(3) R2 .....3.80
Tonawanda(3,4) B12 ....4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover,(Eng.Bolt) U1 ...13.50
Dover(Wrgt.Iron) U1 ...12.25
Economy,Pa.(S.R.) B14..9.60
Economy,Pa.(D.R.)B14 11.90
Economy(Staybolt)B14 ..12.20
McK.Rks.(Staybolt) L5..14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ....13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ...3.70
Alton,Ill.(6) L1 .....3.70
Atlanta A11 .....4.25
Buffalo R2 .....3.70
Cleveland R2 .....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.20
Minnequa,Colo. C10 ....4.50
Niles,Calif. P1 .....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.70
SandSprings,Okla. S6 ....4.60
Seattle B3, N14 .....4.45
So.Chicago,Ill. R2 .....3.70
So.Duquesne,Pa. U5 ....3.70
So.San Francisco B3 ....4.45
SparrowsPoint,Md. B2 ..3.70
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Youngstown R2, U5 ...3.70

BARS, Reinforcing (Fabricated; to Consumers)
Huntington,W.Va. W7 ..5.50
Johnstown, ¼-1" B2 ....4.75
LosAngeles B3 .....5.45
Marion,O. P11 .....5.00
Seattle B3, N14 .....5.55
So.SanFrancisco B3 ....5.45
SparrowsPt. ¼-1" B2..4.75
Williamsport,Pa. S19 ....5.10

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ....3.60
Asland,Ky.(8) A10 .....3.60
Butler,Pa. A10 .....3.60
Cleveland J5, R2 .....3.60
Conshohocken,Pa. A3 ....4.00
Detroit M1 .....4.40
Ecorse,Mich.(8) G5 .....3.80
Fairfield,Ala. T2 .....3.60
Fontana,Calif. K1 .....4.55
Gary,Ind. U5 .....3.60
Geneva,Utah G1 .....3.70
GraniteCity,Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1.3.60
Irvin,Pa. U5 .....3.60
Lackawanna,N.Y. B2 ....3.60
Munhall,Pa. U5 .....3.60
Niles,O. N12 .....5.25
Pittsburg,Calif. C11 ....4.30
Pittsburgh J5 .....3.60
Sharon,Pa. S3 .....4.00
So.Chicago,Ill. W14 ....3.60
SparrowsPoint,Md. B2 ..3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 .....3.60
Weirton,W.Va. W6 .....3.60
WestLeechburg,Pa. A4 ..3.75
Youngstown U5, Y1 .....3.60

SHEETS, H.R. (19 gage)
AlabamaCity,Ala. R2 ....4.75
Dover,O. R1 .....5.65
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. E6 .....5.65
Niles,O. N12 .....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R. (14-ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 .....5.40
Conshohocken,Pa. A3 ....5.65
Ecorse,Mich. G5 .....5.95
Fairfield,Ala. T2 .....5.40
Fontana,Calif. K1 .....6.35
Gary,Ind. U5 .....5.40
Ind.Harbor,Ind. I-2 ....5.40
IndianaHarbor,Ind. Y1..5.90
Irvin,Pa. U5 .....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 .....5.40
Sharon,Pa. S3 .....5.40
So.Chicago,Ill. U5 .....5.40
SparrowsPoint(36) B2 ..5.40
Warren,O. R2 .....5.40
Weirton,W.Va. W6 .....5.75
Youngstown U5 .....5.40
Youngstown Y1 .....5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....6.55
Ecorse,Mich. G5 .....7.10
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.55
IndianaHarbor,Ind. Y1 ..7.05
IndianaHarbor,Ind. I-2, .6.55
Irvin,Pa. U5 .....6.55
Lackawanna(37) B2 ....6.55
Pittsburgh J5 .....6.55
SparrowsPoint(38) B2 ..6.55
Warren,O. R2 .....6.55
Weirton,W.Va. W6 .....6.90
Youngstown Y1 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana, Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh- J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 Ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

ROOFING SHORT TERNES (8 lb. coated)

Gary,Ind. U5	9.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, LONG Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo C16	6.25	...
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
BeechBottom W10 (cut lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11	9.20	9.45
Sp Pt.Md. B2	8.55	8.80
Warren R2	8.45	8.70
Weirton W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. J5	5.85
Yorkville,O. W10	6.15

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S8	5.85
Youngstown U5	5

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill.(1) L1	3.75
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
NoTonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFracisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	...
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	...
Detroit D2	5.60	6.65	7.25	...	...
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	...
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	...
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. N8: Cleve.-or-Pitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork, W3	...	...	10.30	12.50	15.35

NewBritn,Conn.(10) S15	10.75
Pawtucket,R.I.(11) N8	10.75
Pawtucket,R.I.(12) N8	11.05
Sharon,Pa. S3	10.60
Worcester,Mass. A7	10.50
Youngstown C8	10.50

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H4 Heppenstall Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones& Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (S) A10 ...3.75
Warren,O. R2 .....4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....5.25

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.05
Riverdale,Ill. A1 .....3.90
Sharon,Pa. S3 .....4.15
Youngstown U5 .....3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19)K4	5.70[2]	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville MS	5.95	6.40
Donora A7	5.70	6.15
Duluth A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.65
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
Sparrows Pt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

WIRE, 16 gage	An'ld Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsvle MS	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass. W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18)*P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

ROPE WIRE	(A)	(B)
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Cleveland A7	8.55	8.80
Donora,Pa. A7	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
NewHaven A7	8.85	8.10
Palmer,Mass. W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Trenton,N.J. A7	8.85	9.10
Waukegan,Ill. A7	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...4.85
Aliquippa,Pa. J5 .....4.85
Atlanta A11 .....5.10
Alton,Ill.(1) L1 .....4.85
Bartonville,Ill.(1) K4 ..4.85
Buffalo W12 .....4.85
Chicago W13 .....5.10
Cleveland A7, C20 ....4.85
Crawfordsville,Ind. MS..5.10
Donora,Pa. A7 .....4.85
Duluth,Pa. A7 .....4.85
Fairfield,Ala. T2 .....4.85
Fostoria,O.(24) S1 ....5.35
Houston S5 .....5.25
Johnstown,Pa. B2 .....4.85
Joliet,Ill. A7 .....4.85
KansasCity,Mo. S5 ....5.45
Kokomo,Ind. C16 .....4.95
LosAngeles B3 .....5.80
Minnequa,Colo. C10 ....5.10
Monessen,Pa. P7 .....5.10
Newark, 6-8ga. I-1.....5.50
No. Tonawanda B11 ....4.85
Palmer,Mass. W12 ....5.15
Pittsburg,Calif. C11 ....5.80
Portsmouth,O. P12 .....5.25
Rankin, Pa. A7 .....4.85
So.Chicago,Ill. R2 .....4.85
So.SanFrancisco C10 ...5.80
SparrowsPoint,Md. B2 ..4.95
Sterling,Ill.(1) N15 ...4.85
Struthers,O. Y1 .....4.85
Torrance,Calif. C11 ....5.80
Waukegan,Ill A7 .....4.85
Worcester,Mass. A7, T6.5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6 .....6.20
Buffalo W12 .....6.35
Cleveland A7 .....5.85
Crawfordsville,Ind. MS..6.20
Detroit D2 .....6.20
Dover,O. G6 .....6.20
Fostoria,O. S1 .....6.00
Kokomo,Ind. C16 .....5.70
FranklinPark,Ill. T6 ...6.20
Massillon,O. R8 .....5.85
Monessen,Pa. P16 ....5.85
Monessen,Pa. P7 .....6.10
NewHaven,Conn. D2 ...6.50
Pawtucket,R.I.(12) NS..6.85
Trenton,N.J. R5 .....6.15
Worcester A7 .....6.15
Worcester T6 .....6.50
Worcester W12 .....6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4 ...8.90
Buffalo W12 .....8.90
Chicago W13 .....8.90
Cleveland A7 .....8.90
Crawfordsville,Ind. MS..8.95
Fostoria,O. S1 .....8.90
Johnstown,Pa. B2 .....8.90
Kokomo,Ind. C16 .....8.90
Monessen,Pa. P16 .....8.90
Palmer,Mass. W12 ....9.20
Portsmouth,O. P12 ....8.90
Roebling,N.J. R5 .....9.20
Waukegan,Ill A7 .....8.90
Worcester,Mass. A7, T6.9.20

WIRE, Galv'd ACSR For Cores

Bartonville,Ill. K4 .....8.50
Monessen,Pa. P16 .....8.50
Roebling,N.J. R5 .....8.80
SparrowsPoint,Md. B2..8.60
Johnstown,Pa. B2 .....8.50

WIRE, Tire Bead

Bartonville,Ill.(1) K4 ..10.90
Monessen,Pa. P16 ....11.40
Roebling,N.J. R5 .....11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....6.25
Alton,Ill.(1) L1 .....6.25
Bartonville,Ill.(1) K4 ..6.25
Buffalo W12 .....6.25
Cleveland A7 .....6.25
Donora,Pa. A7 .....6.25
Duluth A7 .....6.25
Fostoria,O. S1 .....6.25
Johnstown,Pa. B2 .....6.25
LosAngeles B3 .....7.20
Milbury,Mass.(12) N6 .8.05
Monessen,Pa. P7, P16..6.25
Palmer,Mass. W12 ....6.55
Pittsburg,Calif. C11 ....7.20
Roebling,N.J. R5 .....6.55
Portsmouth,O. P12 ....6.25
So.Chicago,Ill R2 .....6.25
So.SanFrancisco C10 ...6.85
SparrowsPoint,Md. B2..6.35
Struthers,O. Y1 .....6.25
Palmer,Mass. W12 ....6.55
Trenton,N.J. A7 .....6.55
Waukegan,Ill. A7 .....6.25
Worcester A7, T6, W12..6.55
Worcester,Mass. J4 ....6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....5.90
Alton,Ill.(1) L1 .....5.90
Buffalo W12 .....5.90
Cleveland, A7 .....5.90
Donora,Pa. A7 .....5.90
Duluth A7 .....5.90
Johnstown,Pa. B2 .....5.90
LosAngeles B3 .....6.85
Monessen,Pa. P7, P16 ..5.90
NewHaven,Conn. A7 ...6.20
Palmer,Mass. W12 ....6.20
Pittsburg,Calif. C11 ....7.10
Portsmouth,O. P12 ....5.90
Roebling,N.J. R5 .....6.20
So.Chicago,Ill. R2 .....5.90
SparrowsPoint,Md. B2 ..6.00
Torrance,Calif. C11 ....7.10
Trenton,N.J. A7 .....6.20
Waukegan,Ill. A7 .....5.90
Worcester,Mass. A7 ....6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2 ...126
Ala.City,Ala.,17-18ga.R2 213
Aliquippa,Pa.9-14½ga.J5 130
Atlanta A11 133
Bartonville,Ill.(19) K4 ..130
Crawfordsville,Ind. MS ..132
Donora,Pa. A7 130
Duluth A7 130
Fairfield,Ala. T2 130
Houston,Tex. S5 138
Johnstown,Pa. B2 130
Johnstown,17ga.,6" B2 ..204
Johnstown,17ga.,4" B2 ..207
Joliet,Ill A7 130
KansasCity,Mo. S5 142
Kokomo,Ind. C16 132
Minnequa,Colo. C10 138
Monessen. Pa. P7 135
Pittsburg,Calif. C11 153
Portsmouth,O.(18) P12 ..137
Rankin,Pa. A7 130
So. Chicago,Ill. R2 126
Sterling,Ill.(1) N15 130

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2	140
Duluth A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago R2	140
Tonawanda B12	140
Williamsport,Pa. S19	150

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	143
Crawfordsville MS	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville MS	132
Donora,Pa. A7	123
Duluth A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburgh,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2 ...6.10
Bartonville,Ill.(19) K4..5.95
Crawfordsville,Ind. MS..6.30
Donora,Pa. A7 .....5.95
Duluth A7 .....5.95
Johnstown,Pa. B2 .....5.95
Joliet,Ill. A7 .....5.95
Kokomo,Ind. C16 .....6.05
Minnequa,Colo. C10 ....6.20
Pittsburg,Calif. C11 ....6.90
Portsmouth,O. P12 .....6.25
Rankin,Pa. A7 .....5.95
So.Chicago,Ill. R2 .....6.10
SparrowsPoint,Md. B2 ..6.05
Sterling,Ill.(1) N15 ....5.65
Worcester,Mass. A7 ....6.25

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3...$7.35
Wheeling,W.Va. W10 ...7.15

NAILS & STAPLES, Stock To dealers & mfrs. (7)

	Col.
AlabamaCity,Ala. R2	114
Aliquippa,Pa.(13) J5	113
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. MS	122
Donora,Pa. A7	118
Duluth A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(32) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.10

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

AXLES

Ind.Harbor,Ind. S18	5.60
Johnstown,Pa. B2	5.60

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50		4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...(16)	4.00
Lackawanna B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 Mcinnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll.Mills
N15 Northwestern S.&W.Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts.Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield,S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S19 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel

T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

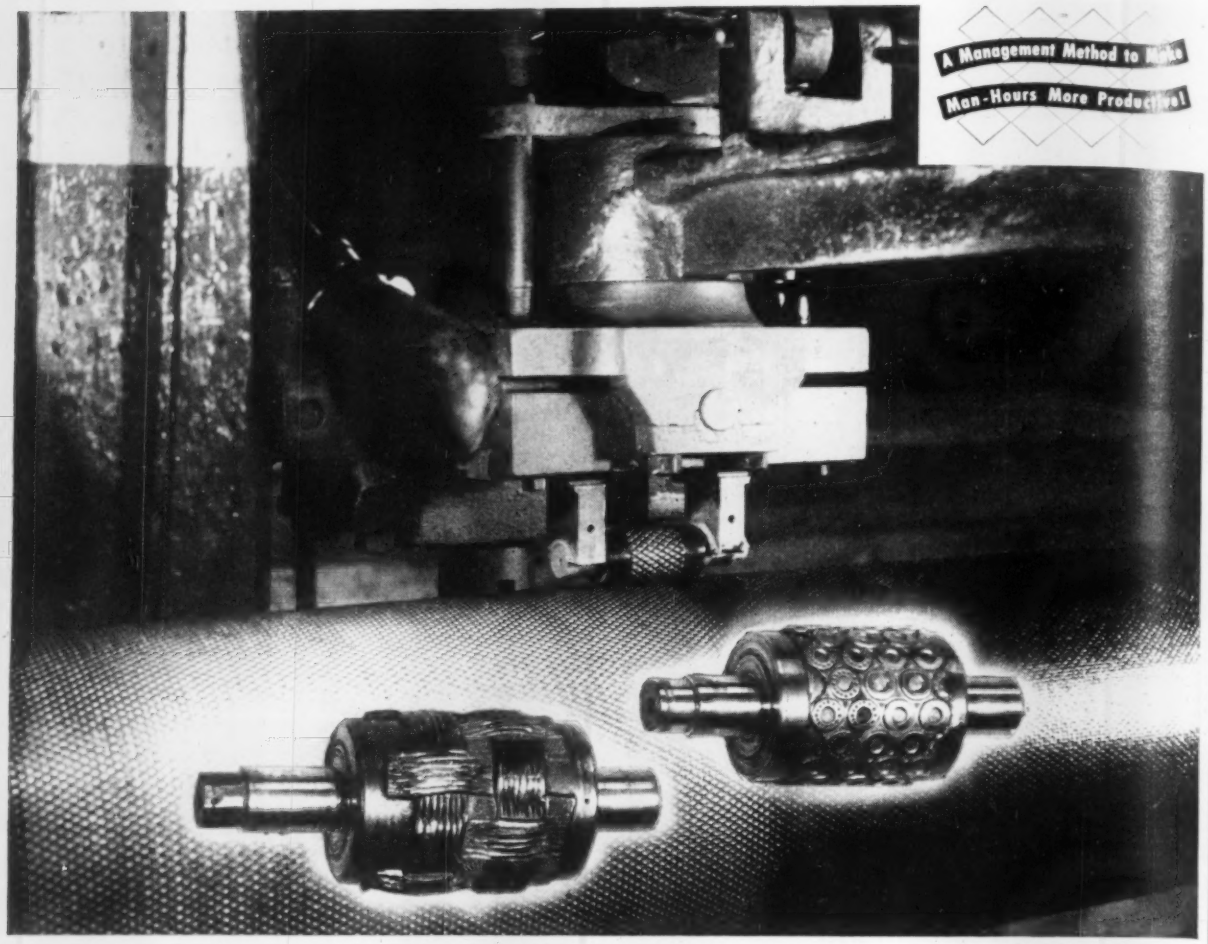
Y1 Youngstown Sheet & Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	23.00	13.5W,4Cr,3V	140.00
Extra Carbon	27.00	18W,4Cr,2V,9Co	217.50
Spec. Carbon	32.50	18W,4Cr,2V,7Co	217.50
Oil Hardening	35.00	18.25W,4.25Cr,1V,4.75Co	185.50
Cr Hot Wrk	35.00	20.25W,4.25Cr,1.6V,12.25Co	323.00
Hi-Carbon-Cr	63.50	1.5W,4Cr,1V,8.5Mo	78.50
18W,4Cr,1V	123.50	6.4W,4.5Cr,1.9V,5Mo	87.00
18W,4Cr,2V	138.00	6W,4Cr,3V,6Mo	109.50

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M14, S8, U4, V2, V3.

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 26" wide.
(24) Deduct 0.20c finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.50c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.55c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035": 0.035" and heavier, 0.25c higher.



How to Put Delicate Patterns Through a 5-Ton "Wringer", Successfully

These knurling mills, made from No. 11 Special (Water-Hard) Tool Steel, press artistic patterns into large steel rolls for embossing cloth, paper and plastic. Here's what was required of the tool steel: It had to be hard enough to prevent upsetting; tough enough to prevent delicate edges from breaking under operating pressures up to 5 tons. Patterns on the mills were quite fragile and sections as deep as $\frac{1}{16}$" could not collapse. Further, the steel had to heat treat with very little warpage.

But picking the proper steel wasn't as tough as you may imagine. For the Carpenter Matched Set Method not only indicated the one *best* steel for the job but enabled production management to "call its shots" . . . have the mills produce the required number of patterns on schedule, with less costly downtime.

For any plant making or using tools and dies, the Matched Set Method offers even more advantages than simplified selection. You benefit from lower tool steel inventories, heat treating economies, simplified toolroom and production procedures. To discover how it can work for you in your plant, write for the new booklet "How to Get Better Tool and Die Performance". THE CARPENTER STEEL CO., 139 W. Bern St., Reading, Pa.

Export Department: Carpenter Steel Co., Reading, Pa. — "CARSTEELCO"

Carpenter

MATCHED TOOL & DIE STEELS

More than top-grade steels . . . a Method to keep tooling and production on schedule!

For your convenience, Carpenter carries warehouse stocks in principal cities throughout the country

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 29.00c; 88-10-2 (No. 215) 44.50c; 80-10-10 (No. 305) 35.00c; No. 1 yellow (No. 405) 25.50c.

Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.85c, delivered.

Lead: Common 16.80c; chemical 16.90c; corroding 16.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 30.75-32.50c; No. 12 foundry alloy (No. 2 grade) 30.75-31.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 32.75-33.50c; grade 2, 30.00-31.50c; grade 3, 30.00-30.50; grade 4, 28.50-30.00c. Prices include freight at c.l. rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 147.00.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 50.50c; 25-lb pigs, 53.15c; "XX" nickel shot, 54.15c; "F" nickel shot or ingots, for addition to cast iron, 51.00c. Prices include import duty.

Mercury: Open market, spot, large lots, New York, $216-$220 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.10 per lb for 500 lb (kegs); $2.12 per lb for 100 lb (case); $2.17 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 90.16c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill)

Sheet: Copper 41.03; yellow brass 37.84; commercial bronze, 95%, 40.99; 90%, 40.55; red brass, 85%, 39.59; 80%, 39.15; best quality, 39.15; nickel silver, 18%, 51.91-52.36; phosphor-bronze grade A, 5%, 60.20-62.82.

Rod: Copper, hot-rolled 36.88; cold-drawn 38.13; yellow brass free cutting, 32.23; commercial bronze, 95%, 40.68; 90%, 40.24; red brass 85%, 39.28; 80%, 38.84.

Seamless Tubing: Copper 41.07; yellow brass 40.85; commercial bronze, 90%, 43.21; red brass, 85% 42.50.

Wire: Yellow brass 38.13; commercial bronze, 95%, 41.28; 90%, 40.84; red brass, 85%, 39.88; 80%, 39.44; best quality brass, 39.44.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.295; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 30.10, l.c.l. 30.18, 100,000 lb lots 29.35; magnet, del., 15,000 lb or more 34.50, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	52.0	...	...
0.156-0.188	44.0	...	...
0.219-0.313	41.5	...	...
0.375	40.0	46.0	48.0
0.406	40.0	...	...
0.438	40.0	46.0	48.0
0.469	40.0	...	...
0.500	40.0	46.0	48.0
0.531	40.0	...	...
0.563	40.0	...	45.0
0.594	40.0	...	...
0.625	40.0	43.5	45.0
0.688	40.0	...	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	...	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	...	...
1.625	36.5	...	39.5
1.688-2.000	36.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 71.50c. Strip, cold-rolled, 77.50c. Rods and shapes, 67.50c. Plates, 69.50c. Seamless tubes, 100.50c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 57.00c. Strip, cold-rolled 60.00c. Rods and shapes, 55.00c. Plates, 56.00c. Seamless tubes, 90.00c. Shot and blocks, 50.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 37.69c; oval 37.19c. Cast 37.375c, delivered in eastern territory.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 60.8c, under 1000 lb 62.5c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98% ½-oz ball, in 200 lb drums, 1 to 900 lb, 19.00c; 1000 to 18,900 lb, 18.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 200 lb, 29.25c; over 200 lb 28.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 68.50c; 10,000 to 30,000 lb, 69.50c; 3000 to 10,000 lb, 70.50c, 500 to 3000 lb 71.50c; 100 to 500 lb, 73.50c; under 100 lb, 76.50c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 35.00c; 400-lb bbl, 33.00c up to 10,000 lb, 32.50c; over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; ball, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers nom.; 100 or 300 lb drums only, 100 to 500 lb, nom.; 600 to 1900 lb, nom.; 2000 to 9900 lb, nom.; f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more durms, 45.7c, f.o.b. Niagara Falls, N.Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb nom.; more than 2000 lb, nom., f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, nom.; 100 lb kegs nom., f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 20,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	23.00	23.00	22.25
Yellow Brass	20.125	19.875	18.75
Commercial Bronze			
95%	21.875	21.625	21.125
90%	21.75	21.50	21.00
Red Brass			
85%	21.50	21.25	20.75
80%	21.375	21.125	20.625
Muntz metal	19.00	18.75	18.25
Nickel, silver, 10%	22.25	22.00	11.125
Phos. bronze, A	24.00	23.75	22.75

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 29.00; No. 2 copper 26.00; light copper 24.50; composition red brass 25.00-25.50; radiators 19.50; heavy yellow brass 19.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 21.50*; No. 2 copper 20.00*; light copper 19.00*; refinery brass (60% copper) per dry copper content 20.00.

* Nominal.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 25.50-26.50; No. 2 24.00-25.00; light copper 22.00-22.50; No. 1 composition red brass 22.00-23.00; No. 1 composition turnings 21.00-22.00; mixed brass turnings 13.00; new brass clippings 20.00-21.00; No. 1 brass rod turnings 19.00; light brass 15.00; clean heavy yellow brass 17.50; new brass rod ends 19.50; auto radiators 17.50-18.00; cocks and faucets, 19.00-19.50; brass pipe 20.00-20.50.

Lead: Heavy 16.50-16.75; battery plates 9.50-10.00; linotype and stereotype 17.00; electrotype 15.75-16.00; mixed babbitt 17.00.

Zinc: Old zinc 12.50-13.00; new die cast scrap 12.50-13.00; old die cast scrap 8.25-8.50.

Tin: No. 1 pewter 80.00-85.00; block tin pipe 110.00-120.00; No. 1 babbitt 70.00-75.00.

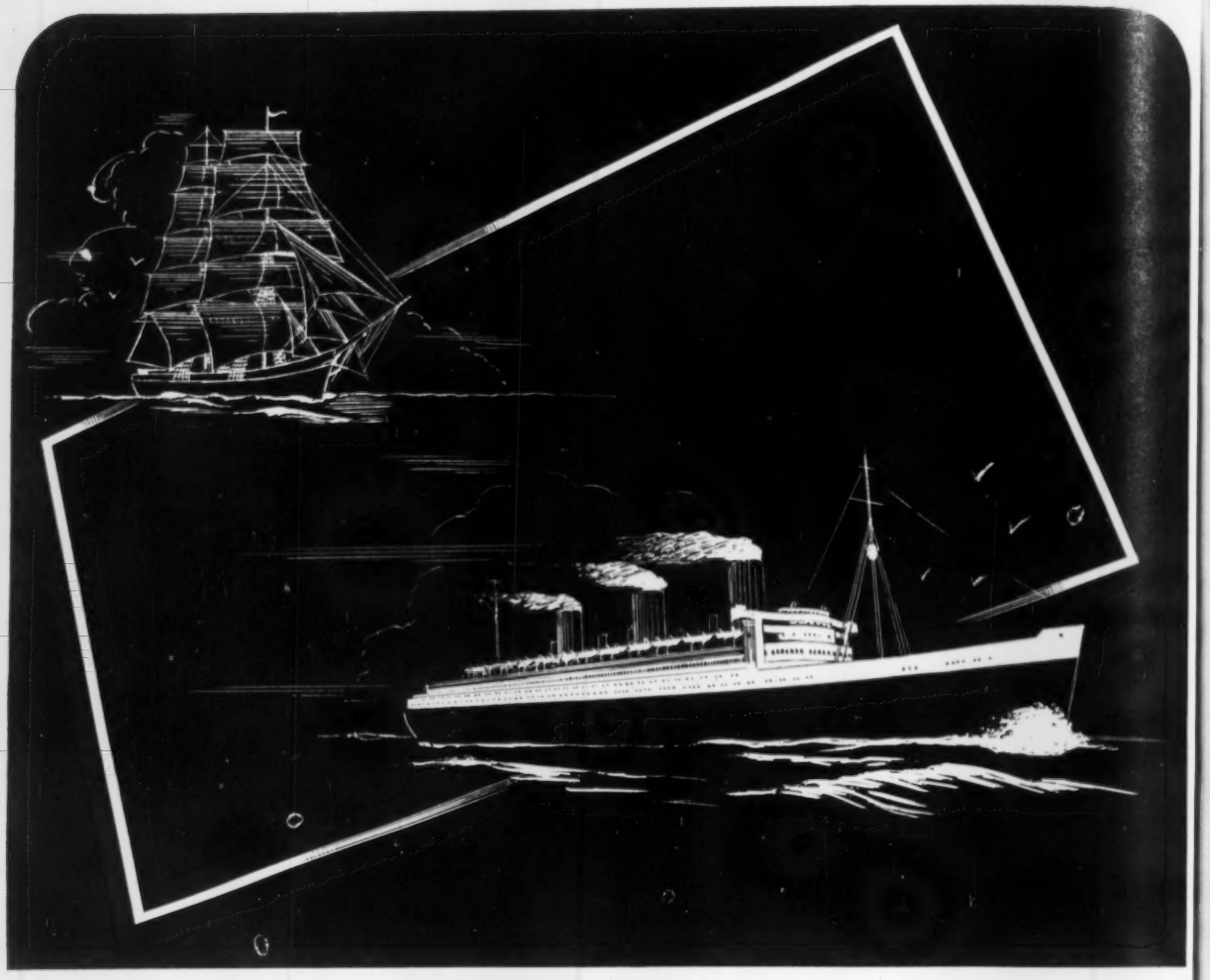
Aluminum: Clippings 28 21.50-22.00; old sheets 17.00-17.50; crankcase 17.00-17.50; borings and turnings 15.00.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Apr. 12	24.50	16.80	17.50	147.00	19.00	42.00	50.50	90.16
Apr. 9-11	24.50	16.80	17.50	150.50	19.00	42.00	50.50	90.16
Apr. 6-7	24.50	16.80	17.50	150.00	19.00	42.00	50.50	90.16
Apr. 5	24.50	16.80	17.50	149.875	19.00	42.00	50.50	90.16
Apr. 4	24.50	16.80	17.50	150.00	19.00	42.00	50.50	90.16
Apr. 3	24.50	16.80	17.50	149.50	19.00	42.00	50.50	90.16
Apr. 2	24.50	16.80	17.50	150.50	19.00	42.00	50.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.73	19.00	42.00	50.50	90.16
Feb. Avg.	24.50	16.80	17.50	182.716	19.00	42.00	50.50	90.16
Jan. Avg.	24.50	16.80	17.50	171.798	19.00	35.462	50.50	88.890

* Nominal.

NOTE: Copper; Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.



SINCE 1850

THE MERCHANT MARINE

in its advance from full rigged wooden ships to modern floating palaces of steel, has been paced by the production and transportation of the necessary ores from which have been made the metals that have made its development possible.

LAKE SUPERIOR IRON ORE • FERRO ALLOYS
VESSEL TRANSPORTATION • COAL

THE Cleveland-Cliffs IRON COMPANY

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

The Metal Market

Government will place copper and aluminum under CMP beginning July 1 and will issue price regulations soon covering major nonferrous metals and related products

FLOW of copper and aluminum, as well as steel, from producer to defense-rated products will be regulated by provisions of the Controlled Materials Plan beginning July 1 (see details on page 43, this issue). CMP will regularize distribution of these metals to consumers engaged in defense work, but will not solve the difficult supply problem for other classes of consumers.

On the price front, RFC continues to set the daily tin quotation and has lowered it to around $1.47 from a recent high of $1.50½. When this agency was appointed the sole seller in this country, the market was quoted $1.34. Price movements in other nonferrous markets are confined to scrap material, but these will be halted soon by OPS.

Tailored price regulations, covering major metals and their related products, are about ready for promulgation. The following products will be removed from the general price freeze and will be placed under individual orders: Aluminum and aluminum scrap, copper and copper scrap, lead and lead scrap, zinc and zinc scrap, nickel scrap, brass mill scrap, tungsten concentrates, mica parts for fabrication, ferrotungsten and related products, ferromanganese and ferrosilicon.

The first of these "tailored" regulations, fixing a ceiling on tungsten at $65 per net ton unit was scheduled to be issued late last week. Tungsten, prior to the effective date of the new regulation, was frozen at rates varying from $27 to $65 per unit. A unit is 20 pounds of tungsten content to a net ton of ore.

Tin Importers Seek Relief

Leading tin importers and dealers are protesting to NPA the government order which prevents private importation of the metal. These interests recommend that:

RFC express its willingness to buy tin from private importers on a competitive basis; NPA authorize the RFC to sell tin to private importers and dealers at the same terms at which it offers to sell tin to consumers; the order be modified so that allocation authorizations shall be issued to purchasers of tin and that these purchasers be free to make the best possible arrangements for the procurement of tin; NPA authorize importers and dealers to carry and maintain stocks of tin in the United States within reasonable prescribed limits.

The tin dealers also question whether RFC is legally authorized to fix the price of tin for importation and sale to consumers in this country. Steps should be taken, they say, to permit private importers to import tin without the unnecessary burden of doing this through the RFC as the sole importer.

The government's decision at the beginning of March to suspend tin purchases for stockpiling has resulted in a sharp drop in imports. Tin exports from Malaya to the United States in March dropped to only 130 tons from 1280 tons in February and compared with 4634 tons in March, 1950. Total tin shipments from Malaya during March, however, increased to 5988 tons from 5412 tons in February and compared with 6702 tons a year ago. Of the March exports, shipments to the United Kingdom increased to 1383 tons from 210 tons in February; those to continental Europe, to 2577 tons from 2495; to British possessions, to 691 tons from 428; to other countries, to 1207 tons from 999.

Metal Imports May Drop

Further contraction of copper, lead and zinc supplies will develop if the threatened strike of Mexican miners materializes. The strike would affect over 60 companies including such United States affiliate companies as American Smelting & Refining Co., Mexican Zinc Co. (American Zinc Co.) and Cananea Copper Co. These companies ship more than 90 per cent of their production to the United States. In addition, American Metal Co.'s Blackwell, Okla., smelter is largely dependent on ores and concentrates from Mexico. American Zinc, Lead & Smelting Co.'s smelters at Dumas, Tex., and East St. Louis, Mo., also normally treat large tonnages of Mexican material.

Consumers need all the metal they can get from foreign sources to augment the inadequate domestic supply. Stocks of slab zinc held by smelters in this country at the end of March amounted to only 11,105 tons, equivalent to only about three days' needs. Shipments are restricted to the current output of smelters, amounting to 80,450 tons last month. During the last six months, production of slab zinc amounted to 470,881 tons while shipments totaled 470,043.

More Metal for Transit Cars

Manufacturers of public transit vehicles were granted interim relief from aluminum and copper limitations in the second quarter of 1951 by National Production Authority. This relief permits the manufacture of 15 streamlined streetcars, 80 rapid transit cars, 222 silent electric trolley coaches and 2000 city and intercity busses.

Aluminum Output Gains

Aluminum supplies are increasing, but defense requirements are gaining at an even faster pace. This accounts for the fact that you may be having more difficulty in obtaining required tonnages. Average daily production of primary aluminum rose more than 2 per cent in February, reflecting the industry's continuing efforts to boost its output, says D. M. White, secretary, Aluminum Association New York. Shipments of fabricated aluminum products showed a decline due to the shorter month.

Alcoa Curtails at Massena

A shortage of aluminum for civilian products will necessitate the laying off of approximately 70 employees at the Massena Works of Aluminum Company of America, Massena, N. Y., it was announced by J. H. DeKlyn, works manager.

FOR LOW CEILINGS: Operator at the Resurrection Mining Co., Leadville, Colo., changes battery box of a General Electric 1½-ton 40-volt trammer locomotive at the battery-charging roll-off table. This compact locomotive can operate on narrow track, has a folding cab to permit loading in limited mine hoist cages, and is designed for use in metal mines where clearances are restricted

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, effective Feb. 7, 1951.

STEELMAKING SCRAP COMPOSITE

Apr. 12	$41.00
Apr. 5	41.00
Mar. 1951	44.00
Apr. 1950	29.40
Apr. 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

No. 1 Heavy Melting Steel (Grade 1)

Basing Point	Dealer, Industrial	Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 heavy melting steel) for other grades of dealer and industrial scrap.

Open-hearth and Blast Furnace Grades

2. No. 2 Heavy Melting	—$2.00
3. No. 1 Busheling	Base
4. No. 1 Bundles	Base
5. No. 2 Bundles	— 3.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Electric Furnace and Foundry Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate Scrap	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
20. Foundry Steel, 2 feet and under	+ 2.00
21. Foundry Steel, 1 foot and under	+ 4.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	— 3.00
24. Heavy Turnings	— 1.00

Special Grades

25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00

Restrictions on Use

(1) Prices for Grades 11, 23 and 24 may be charged only when shipped to a consumer directly from an industrial producer of such grades; otherwise ceiling prices shall not exceed prices established for the corresponding grades of basic open-hearth and blast furnace scrap.

(2) Prices established for Grades 26 and 27 may be charged only when such grades are sold for use for chemical or annealing purposes; otherwise ceiling prices for such grades shall not exceed the price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price for such grade shall not exceed the ceiling price established for the corresponding grade of basic open-hearth.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings of scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $4; 75% and over, $6; less than 75%, $10.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $15.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy Melting Steel	—$2.00
3. No. 2 Steel Wheels	Base
4. Hollow Bored Axles	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel	— 6.00
9. Uncut Frogs, Switches	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
22. Uncut Bolsters & Side Frames	Base
23. Cut Bolsters & Side Frames	+ 3.00
24. Angle & Splice Bars	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling price for such grade shall not exceed ceiling price established for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling price for such grade shall not exceed ceiling price established for No. 1 heavy melting steel.

CAST IRON SCRAP

Ceiling price per gross ton for any of the following grades of cast iron scrap shall be the price shown in the following table, f.o.b. shipping point.

1. Cast Iron, No. 1 (Cupola Cast)	$49.00
2. Cast Iron, No. 2 (Charging Box Cast)	47.00
3. Cast Iron, No. 3 (Heavy Breakable Cast)	45.00
4. Cast Iron, No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery Cast	52.00

Restrictions on Use

(1) Ceiling shipping point or on-line price which a basic open-hearth consumer may pay for No. 1 cast iron, No. 1 wheels, clean auto cast or malleable shall be the ceiling price established for No. 3 cast iron.

(2) Ceiling shipping point or on-line price which any foundry consumer other than a malleable iron producer may pay for Grade 10 shall be the ceiling price established for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin which is allocated by the National Production Authority to a consumer, shall be as follows:

(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.
(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3.
(4) For preparing into Grade No. 25, $6.
(5) For preparing into Grade No. 19, $6.
(6) For preparing into Grade No. 12, Grade No. 13, Grade No. 14, or Grade No. 18, $10.
(7) For preparing into Grade No. 17 or Grade No. 21, $10.
(8) For preparing into Grade No. 16 or Grade No. 20, $10.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be as follows:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
(3) For preparing into Grade No. 16, $4.
(4) For preparing into Grade No. 17, $5.
(5) For preparing into Grade No. 18, $7.
(6) For preparing into Grade No. 21, $4.
(7) For preparing into Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron shall be limited to the following:

(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and the consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless the consumer obtains prior written approval from OPS.

No preparation charge other than the charges set forth above may be made for the preparation of any grade of iron or steel scrap unless the consumer has secured prior written approval of such charges from OPS.

Commissions

No commissions shall be payable except by a consumer to a broker for brokerage services rendered. Where scrap is allocated by NPA other than from a government agency, the seller may designate a broker. Where scrap is allocated by NPA from a governmental agency, the consumer may designate a broker. In the event a broker purchases scrap for sale to a consumer, such consumer may pay such broker a commission not exceeding $1 a ton.

Unprepared Scrap

The term "unprepared scrap" shall not include such demolition projects as bridges, box cars or automobiles, which must be so priced that the prepared scrap will be delivered to the consumer within the established ceiling delivered prices.

For unprepared steel scrap other than materials suitable for hydraulic compression, the ceiling basing point prices shall be $8 per gross ton beneath the established ceiling price of the prepared base grades, No. 1 heavy melting or No. 1 railroad heavy melting steel.

For unprepared material which when compressed constitutes No. 1 bundles the ceiling basing point price shall be $6 per gross ton beneath the ceiling basing point price for No. 1 bundles; or when compressed constitutes No. 2 bundles the ceiling basing point price shall be $8 per ton beneath the ceiling basing point price for No. 2 bundles.

Any iron casting which cannot be broken with an ordinary drop into Grade No. 2 or Grade No. 1 may not be classified as Grade No. 3. Where such iron casting requiring blasting or other special preparation is sold to a consumer of scrap, the shipping point price for Grade No. 3 must be reduced by the amount of the additional charges required for preparation.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100 when sold for electric furnace use only.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.
Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.
Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c. Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.
Coatesville, Pa., 50c; Conshohocken, Pa., 20c.
Detroit, 95c; Duluth, Minn., 50c.
Harrisburg, Pa., 51c; Houston, Tex., 57c.
Johnstown, Pa., 75c.
Kansas City, Mo., 78c; Kokomo, Ind., 51c.
Los Angeles (including Firestone switching district), 66c.
Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.
Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.
St. Louis (including Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.
Warren, Pa., 75c; Weirton, W. Va., 70c.
Youngstown, 75c.

Sheets, Strip . . .

Sheet and Strip Prices, Page 129 & 130

New York — Sheet producers are winding up their June allocations. Still substantially more tonnage is going into rated work. This is ascribed not only to more DO-rated work, but to more tonnage for directive programs. Delivery promises on DO-rated work vary among the different producers and this is particularly true with respect to stainless steel sheets. Some producers can still offer July shipment although the majority can do little better than August or September and in a few instances have little to offer before fourth quarter. Maintenance and repair rating DO-97 is making for a squeeze in nickel.

Philadelphia—One mill has nothing to offer on DO-rated work before September on hot-rolled sheets, August on galvanized and July on cold-rolled.

Pittsburgh—Bigger bite will come out of civilian sheet tonnage in June as result of the increases in DO set-asides for that month. Hot-rolled sheet reserve now is 30 per cent, cold-rolled 16, galvanized 20, other coated sheets 16 and hot-rolled strip 16. In addition, the boost in the set-asides on plates to 30 per cent from 25 will siphon off some sheet tonnage since a substantial portion of DO plate requirements is being rolled on the continuous sheet mills.

Reported slackening of activity in civilian goods manufacture finds no reflection here in any noticeable easing in pressure for sheets. Jones & Laughlin Steel Corp. virtually blanked out May for civilian account on tonnage produced at its Pittsburgh works because of lost production during the 3-weeks long strike of plant railroad workers.

Cleveland—Sheetmakers are having increasing difficulty meeting the demands coming to them. Regular civilian goods customers are being cut back further with the defense load constantly rising. Not only are DO set-aside tonnages larger for June, but directives and program requirements, which are over and above the set-asides, are growing steadily.

Cincinnati—Pressure for sheets increases as the influx of rated orders grows. June schedules will show less steel for civilian needs although there is no reflection, in demand, of voluntary cutbacks in end-use programs.

Chicago—Growing consumer goods inventories and the decline in buying has forced some manufacturers to scale down production and lay off workers. This situation, however, has not yet been felt in lessened demand for sheets and strip and other steel products.

Los Angeles — The spotlight was turned on gray market operators at hearings held here by the House of Representatives Small Business Committee, Apr. 4 and 5. Metal fabricators, among the 50 small businessmen who testified, gave names of sellers of premium priced steel to NPA enforcement officials. Product on the gray market mentioned most frequently was sheets at 17-18 cents per pound.

Boston—Flat-rolled steel consumers in some cases are short of steel with rated orders on mill books. Drastic reductions in civilian sheet and strip allocations are contemplated in June schedules. Before end of second quarter shortages will be acute with many consumers.

PRICES UNCHANGED

For current quotations on refractories, ores, pipe, boiler tubes, stainless steels, clad steels, metal powders, bolts, nuts, rivets, washers, electrodes, coal chemicals and fluorspar refer to pages 146 and 147, STEEL, Apr. 9, 1951, issue.

Steel Bars . . .

Bar Prices, Page 129

Boston—Unless bar consumers have ratings, June will be a month of supply crisis, both in carbon and alloys. Heavier set-asides will move some defense tonnage ahead, but at expense of civilian volume. Some doubt exists as to producers' ability to meet warehouse bar loads under M-6. Defense reserve in hot-rolled alloys, 50 per cent of production, is even higher with some mills.

New York—While there was recently a sharp increase in the percentage of material the carbon bar mills were called upon to set aside for DO rated work, much of this added tonnage is said to be scheduled for agricultural requirements for June processing only and therefore promises on DO rated work for various other requirements continue well extended. Most hot carbon bar sellers are still unable to promise much less than August and cold finished carbon bar sellers not less than August and in some cases not less than September.

Philadelphia—Considerable portion of the recent increase in carbon bar minimum quotas for DO-rated work is going to meet June needs of agricultural equipment manufacturers under order M-55.

Pittsburgh—With the mills ordered

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York(c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	7.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	6.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††‖	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††‖	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.32
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.56	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Omaha, Nebr.	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Birm'hm (city)	5.75	6.55	6.90[3]	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm,(w'hse)	5.60	6.40	6.75[3]	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05[3]	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85[3]	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.80[4]	8.90[3]	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60[3]	9.20[3]	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded; ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [4]3500 lb and over; [5]—1000 to 1999 lb.

to reserve more hot-rolled and cold-finished carbon bars, and hot-rolled alloy bars for June on DO account the squeeze on civilian supplies steadily tightens. Supply conditions in the bar market appear to be even tighter than in the light, flat-rolled products, especially the alloy grades.

Cleveland—The bar market picture steadily is becoming more confused. Producers are committed months into the future on DO account and rated and program demands continue to rise. In fact, overall national defense volume has reached the point producers hesitate to even guess what tonnage will be available over coming months for customers on unrated account. Hot-rolled carbon bar set-aside for DO orders in June stands at 35 per cent; on alloy bars at 50 per cent. However, much more tonnage than is covered by these percentages is earmarked for defense since supporting programs and directive tonnage, over and above DO volume, must be provided by the mills.

Los Angeles—Bar producers are booked nine months ahead on non-rated specialty and alloy bars. Rated orders range from 5 to 75 per cent with cold-drawers.

Rails, Cars . . .

Track Material Prices, Page 131

New York—Domestic freight car deliveries in March increased more than 20 per cent, to 7011, according to American Railway Car Institute and the Association of American Railroads. In the preceding month 4842 cars were delivered. March car orders amounted to 11,271 units, of which 8821 went to car builders and 2450 to railroad shops. Cars on order and undelivered as of Apr. 1 amounted to 158,619 cars, of which 113,713 are with car builders and 44,906 with railroad shops.

Pittsburgh—Railroad carbuilders likely will be allocated more steel in May than had been anticipated. After having been cut back to 9000 units, production program for May has been restored to 10,000. New car deliveries fall far short of monthly production goals and totaled only 7011 units in March, but this was an increase of about 20 per cent compared with the preceding month.

Structural Shapes . . .

Structural Shape Prices, Page 129

Boston—More fabricated steel for bridges is being bid direct. Most tonnage required for other construction takes ratings. Private projects must surmount higher prices and extended deliveries.

For June rolling, 151,000 tons of structurals have been approved by NPA for highway construction, about 50 per cent of normal consumption. Federal Bureau of Public Roads advised state highway departments requests for priority assistance on individual projects be presented immediately.

New York—Most fabricators are confining estimates largely to work either definitely rated or likely to be approved by the government. As there isn't too much of this work active here at present local orders are spotty.

Philadelphia—Structural activity is improved. Awards are featured by 3500 tons for plant expansion for Lukens Steel Co., Coatesville, Pa. Wide flange shapes are available for rolling in late July or early August against DO ratings, standard shapes for August and September.

Pittsburgh—Fabricators anticipate delays on projected work because of the shortage of structurals and other building steel items. Inclination of most shops is to hold bookings as far as possible to rated work. Not much change in demand has stemmed from the restrictions on use of steel in certain types of construction. Tonnage for defense plants is more than offsetting any savings.

Seattle—While no sizable awards for shapes were made to local plants last week, large tonnages are pending, mainly for public works. Requirements for military installations in Alaska are exceptionally heavy.

Plates . . .

Plate Prices, Page 129

Boston—Plate producers are frequently 15 to 20 points over required defense set-asides. Full impact of this will be reflected in June schedules, despite production of more light gage tonnage on sheet-strip mills. From standpoint of industrial consumers of light plates, strip mill production offers little relief.

New York—Non-rated consumers are suffering a further cut as plate mills set up their schedules for June. Most mills in the East are allocating about 55 per cent of their production for defense and defense supported programs. No little of this latter tonnage would normally go into civilian needs.

Philadelphia—Plate producers generally are booked into August on DO-rated orders. Most mills have not completed June scheduling with preference tonnage substantially heavier.

Pittsburgh—Plate load on the continuous sheet mills is rising. Latest National Production Authority regulations upped the DO plate set-aside 5 points to 30 per cent for June. Expectations are some of this increased burden will fall on the sheet mills. One steelmaker here reports its continuous mill plate load now is up to 30,000 tons against only 3000 tons a few months back.

Cleveland—Step-up of 5 per cent to 30 per cent in the plate set-aside the mills must reserve for DO orders in June will add to the load on the continuous sheet mills. Some of the increased tonnage is destined for the farm implement makers and it is thought a large part of such needs will be placed with mills that normally produce plates only on a limited scale since the regular plate producers reportedly are booked as far ahead as third quarter on rated tonnage.

Chicago—Plate fabricators complain they are receiving insufficient tonnages to maintain operations. Rated orders aggregate from 15 per cent of total business to 60 to 70 per cent in others. Shortages of plates exist in both heavy and lighter sizes rolled on sheet mills.

Seattle—Anticipating labor troubles, some local plate shops have increased operations to clean up backlogs as much as possible before potential idleness. Scarcity of materials is handicapping bidding, even the larger operators hesitating to commit themselves. Considerable tonnage is being used in classified projects.

Warehouse . . .

Warehouse Prices, Page 139

Cleveland—Volume of steel warehouse business is limited by unbalanced and depleted stocks. Distributors are shipping tonnage almost as fast as it is received. There is no reflection in demand of a reported slowing down in civilian durable goods manufacture.

Trade here anticipates announcement this week by the Office of Price Stabilization of price regulations governing sale of steel by the prime warehouses, secondary distributors and sellers of imported material.

Ceiling prices, it is reported, will be based on average monthly product costs, including freight and mill extras, plus a percentage markup.

Ceilings for sellers of so-called secondary products, and imported steel will be determined on a somewhat different formula from that used for establishing prime warehouse ceilings, it is said. The regulations, it is understood, will be so set up as to make excessive pricing by gray market operators more difficult.

Pittsburgh—Whether the warehouses will benefit much from the revision in NPA order M-6 stipulating that the mills ship the distributors 85 per cent of their base period receipts will not be known for some weeks. The producers indicate there will be some difficulty in fully complying with the order.

As a general thing warehousemen agree if they receive as much tonnage this year as they did in 1950 they will be doing well. Latest data show the mills in 1950 shipped the warehouses 13.3 million tons, 30 per cent more than in 1949. The distributors ranked second as a steel outlet, taking almost 19 per cent of total mill shipments last year.

Philadelphia—Warehouses anticipate a decline in volume this month. In some lines there is not quite the pressure. Much interest centers in mill allocations for June, the first month under the amended order providing that producers supply the warehouses with a minimum of 85 per cent of their tonnage receipts in the base period.

Chicago—Warehouse customers report increasing difficulty in obtaining sufficient steel to support operations. Increasing dependence upon premium and gray market offerings is noted. Surprising amount of this higher priced steel seems available. Currently most pronounced shortages are in cold-finished carbon and alloy bars, sheets and plates and stainless items.

Seattle—Some Japanese sheets and plates have been imported by warehouses here, but not in sufficient tonnage to relieve current shortages.

San Francisco—Steel is costing warehouse customers a bit more at times. They are not always able to take advantage of the quantity price level because they often must place

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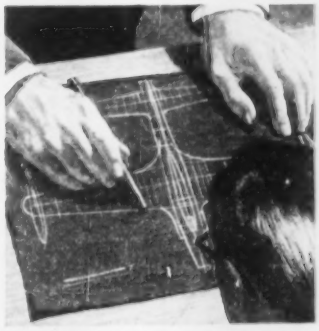

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orders with two or more warehouses to obtain desired tonnage. Generally, stocks are low.

Tin Plate . . .

Tin Plate Prices, Page 130

Pittsburgh—Tighter limitations on use of tin plate in packing various products will serve to ease demand pressure on the mills to only slight extent, in the opinion of producers. NPA's amended order M-25 cuts can quotas for certain packs, such as beer, pet foods and certain non-food items in second quarter to no more than 75 per cent of tin use in these packs in the like 1949 or 1950 period.

Wire . . .

Wire Prices, Page 131

Chicago—Wire and wire products producers are experiencing lessened pressure for fencing and fence posts. Farmers are turning to field chores or had the foresight to stock up during the winter.

Boston—Although rated orders are on the increase some wire mills in the East are booked below set-aside limit on both carbon and alloys. Percentage-wise alloy DO orders are better than two to one over carbon.

Pig Iron . . .

Pig Iron Prices, Page 128

Boston—Spreads in delivered pig iron prices, Everett-Boston and Buffalo-Boston, also from Bethlehem, have widened to nearly $10 a ton. Equalization points between these points have also extended in favor of the New England producer. Under normal economy these cost differences would be a factor in distribution, but lack of iron and absence of competition cancels normal trading.

New York—While pig iron supply is shinking, most foundries in this district are maintannng good operatons. Most are operating five days a week, some six days. To do this, however, they are using more scrap and ferroalloys for sweetening purposes.

Buffalo—District pig iron output dropped 6 points from capacity production when the Bethlehem Lackawanna plant was forced to shut down one of its 6 active units for relining.

Philadelphia—Some foundries are are not pressing so hard for pig iron because of a leveling off in demand for castings. However, iron demand exceeds supply. Purchase of a district mill several weeks ago diverted some of the iron produced by it.

General supply outlook is depressed by the drying up of foreign supply. Little import iron is being promised beyond end of the first half.

Pittsburgh—Reported slackening of activity among some manufacturers of civilian goods is not reflected in any easing in demand for iron. In fact, pressure for tonnage is increasing. Inquiry from outside this district is flooding the lone merchant producer here which is fully committed to its regular customers.

Ft. Pitt Malleable Iron Division, Steel Trading Corp., plans to resume production Apr. 16 at McKees Rocks, Pa., after having been inactive for about a year. The foundry's pig iron requirements are expected to be supplied by Pittsburgh Coke & Chemical Co. Extensive repairs to cupola and melting furnaces have been completed.

One of the Homestead stacks of the United States Steel Co., recently converted for high-pressure operation, has been placed in blast.

Pig iron producers in this country with blast furnaces operating under the high-pressure system include Republic Steel Corp. and Youngstown Sheet & Tube Co.

Recently the No. 2 furnace at the Clyde Iron Works of Colvilles, Ltd., Glasgow, Scotland, started pressure operation. This is the first stack outside the United States to employ this system.

Cleveland—Foundry operations are being maintained at high level here despite short supply position in all raw materials. Pig iron is coming through steadily from merchant sellers, and in sufficient volume to support melting schedules. However, the foundries are unable to build satisfactory inventories with defense demand for castings increasing.

Cincinnati—Pig iron is in such short supply some foundries are using a larger proportion of scrap.

Chicago—While pig iron, scrap and coke is the determining factor in foundry operations less is heard of supply difficulty than formerly. Inference is suppliers are doing a heads-up job in supervising shipments under the quota programs they have imposed. Few foundrymen argue for government allocations or a CMP program. DO rated orders are increasing.

Seattle — Pig iron continues very tight. Only occasional lots of domestic iron are available while foreign sellers have raised their prices, added to which is the scarcity of steamship space. Delivered prices of foreign pig are reported $10 higher than domestic.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 147

Pittsburgh—Demand pressure has eased temporarily, especially for beehive furnace grades. Slackening is attributable to the taking off of two district blast furnaces for repairs, and also temporary withdrawal of a large eastern steelmaker which had been purchasing substantial beehive tonnage for some time past.

Due to the temporary easing in demand sellers are inclined to move slowly in moving prices upward to the limits allowed under the recent ruling of the price stabilization authorities to offset raw material cost increases since January. Representatives of the OPS met with district coke sellers last week and explored the pricing situation. However, determination of future policy on prices remains to be developed.

Cleveland—Some beehive foundry coke is coming into this area but little of it is the desirable 72-hour grade. With oven coke in limited supply a broad market is seen open to beehive oven operators for the harder coke. Bulk of output, however, is said to be the 48-hour grade. The market continues firm at January levels and talk of a price increase, permissible under the latest OPS ruling to the extent of raw material cost increases, has for the moment, at least, just about disappeared.

Iron Ore . . .

Cleveland—Lake Superior iron ore shipping season opened Apr. 6 when the *Joseph Sellwood* left Escanaba. Total shipments from that port for the week ended Apr. 9 amounted to 50,062 tons, while shipments from Michipicoten totaled 22,300 tons. The first cargo of iron ore last year was not received at lower lake ports until the final week in April.

Scrap . . .

Scrap Prices, Page 136

Boston—At times steel scrap consumers have been down to under one week inventory and supply of heavy melting continues short. Allocations have enabled some consumers to maintain operations. Scrap allocated from government shops as unprepared at $8 per ton under the No. 1 heavy melting price is a bargain as much of this tonnage requires no preparation.

Buffalo—With approximately 15,000 tons arriving by boat from upper lake ports scrap supply shows improvement in the Niagara Frontier area.

Philadelphia—Close to 50 per cent of the steel scrap is under allocation, with all of the railroad material and much industrial scrap moving under direction. Flow is easier but consumers are losing ground. There is less upgrading. However, many in the trade believe a revision in price schedules will be necessary to clean the situation up.

Pittsburgh — Unless more scrap comes onto the market soon some openhearth furnaces will be forced onto the inactive list in 30 to 60 days. That was the prediction of one buyer for a large steel mill here last week. Other district buyers are less concerned for the near-term, but all insist the outlook for the longer term is cause for apprehension.

Steel mill scrap inventories have been shinking steadily. Electric furnaces reportedly are in a more vulnerable position as regards supply than are the open hearths.

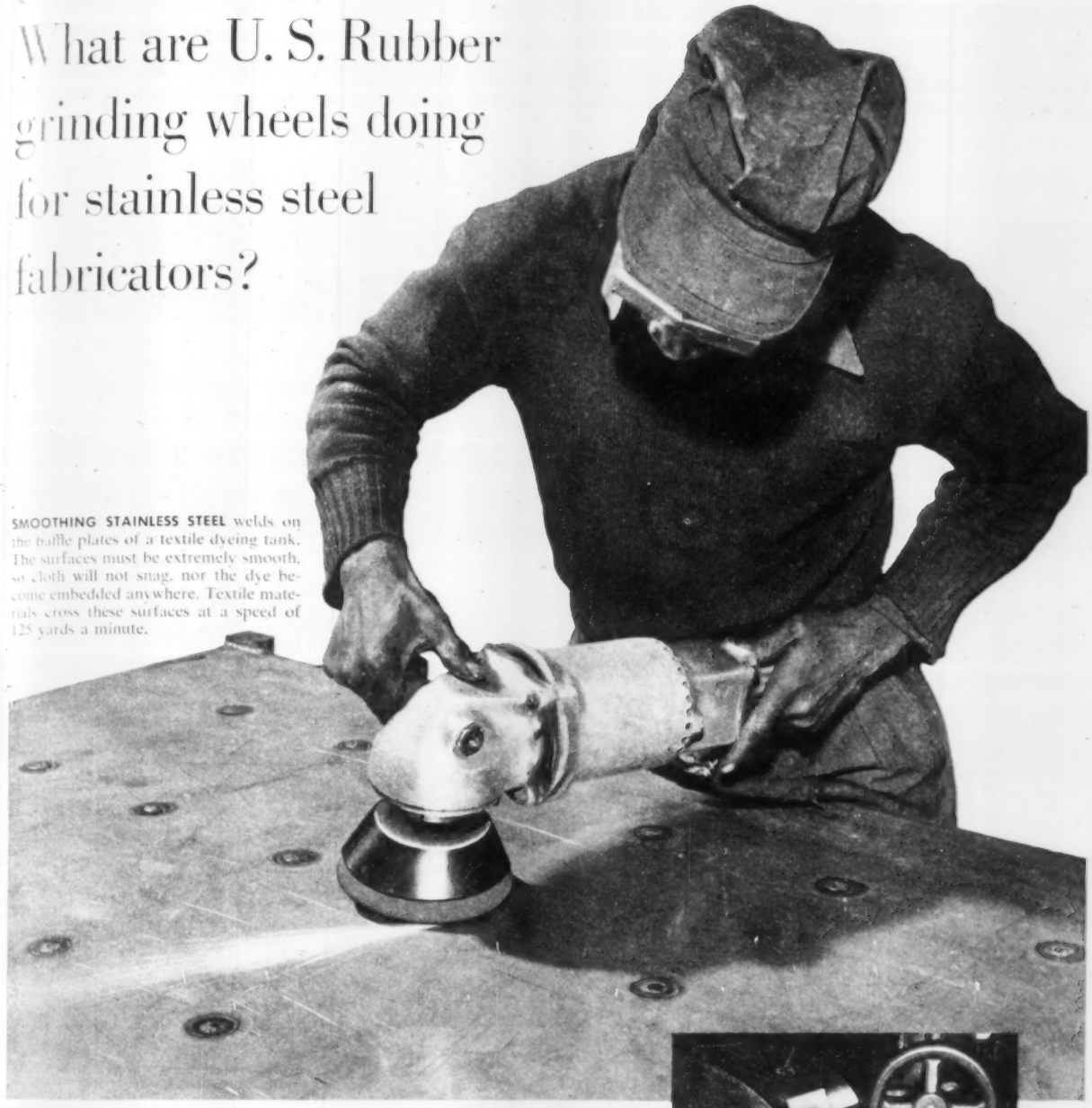
Reports are heard of considerable upgrading.

Detroit—Imposition of government allocation of dealer scrap is inevitable, dealers believe. Operation of mills here has not suffered for lack of scrap, since the area is the largest scrap producer. However, disruption which the price wrangle caused to normal scrap flow resulted in some mills using emergency measures, such as trucking in material. Mills are getting refunds on purchases at the higher price before it was officially sanctioned.

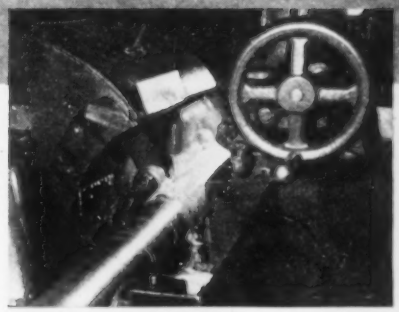
Cleveland—Amount of scrap passing through local yards has dropped 30 to 50 per cent from the level prevailing in the period immediately preceding the effective date of the scrap price regulation. Dealers are exerting pressure on Washington authorities to modify the regulation to restore the normal flow of railroad scrap through their yards.

Cincinnati—Reserves of scrap are below normal and in some cases sup-

What are U. S. Rubber grinding wheels doing for stainless steel fabricators?



SMOOTHING STAINLESS STEEL welds on the baffle plates of a textile dyeing tank. The surfaces must be extremely smooth, so cloth will not snag, nor the dye become embedded anywhere. Textile materials cross these surfaces at a speed of 125 yards a minute.



CENTERLESS GRINDING the stainless steel tubing which is used as rollers in textile dyeing and finishing tanks. A centerless grinder equipped with U.S. *Vulcanite* Grinding and Regulating wheels is used.

As an example, many makers of expensive stainless steel textile dyeing and finishing equipment depend on U.S. *Royalite* and *Vulcanite* Grinding Wheels to help give their products their high state of perfection.

Over 88 years of experience and research in bonds and abrasives stand behind each of the wheels in the U.S. Rubber line. Whatever your grinding problem may be, a "U.S." Wheel can handle it. Write to address below.

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UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

ply is hand-to-mouth. Allocations are appearing more often. Mills are now accepting remote shipments despite the cost.

Chicago—Allocations of steelmaking scrap from this district to other districts under NPA directives are increasingly more disturbing to mills and supply sources. Inventories are being depleted and will produce a precarious situation within six weeks. Either the raiding will have to be halted or material will have to be allocated into the area. Mills are bringing scrap in from remote points, using World War II springboard pricing procedure. Cast scrap remains exceedingly tight and foundries must go far afield to acquire supplies.

Los Angeles—Collections have fallen sharply and there is not enough scrap to go around. Mill inventories are down to 2 to 3 weeks' supply. Dealers and buyers blame shortage on price ceilings.

Seattle—While the steel scrap situation continues critical, receipts have improved with more favorable weather in the hinterland. Buyers have not discovered profitable new supply sources and anticipate the future with considerable apprehension in view of the large consumption in this area. Inventories are being lowered from day to day.

Fasteners . . .

Pittsburgh—Industrial fastener producers report a steadily rising volume of defense and related orders, including MRO 97 tonnage. But steel supply continues a headache despite mill allotments on DO account. Tonnage on the regular DOs is coming through, but difficulty is being encountered in getting shipments from the mills against MRO 97 orders. National Production Authority ruled the steel mills can defer action on MRO shipments in April and May where such requirements are involved in directive programs. In effect, this appears to have crossed many MRO 97 orders out of the picture at least until June. By that time it is hoped the confusion resulting from the influx of MRO orders will be cleared away.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3500 tons, plant extension, Lukens Steel Co., Coatesville, Pa.; 1000 tons to Belmont Iron Works, Eddystone, Pa., for a sodium hydrate plant and 1000 tons to Bethlehem Steel Co. for a centralized maintenance building.

1855 tons, factory building, Utica, N. Y., General Electric Co., Schenectady, N. Y., to the American Bridge Co., Pittsburgh.

1500 tons, (previously reported 500 tons or more) special items for Albeni Falls dam, Idaho, to Consolidated Western Steel Corp., Seattle.

1150 tons, plant, General Refractories Co., Morrisville, Pa., to American Bridge Co., Pittsburgh.

670 tons, addition, Hackensack, N. J., hospital, to Bethlehem Steel Co.

600 tons, plant addition, E. J. Lavino & Co., Plymouth Meeting, Pa., to Belmont Iron Works, Eddystone, Pa.

535 tons, plant addition, Monroe Calculating Machine Co., Morristown, N. J., to Elizabeth Iron Works, Elizabeth, N. J.

500 tons, addition, Atlantic terminal, Brooklyn, to Bethlehem Steel Co.

430 tons, manufacturing building, Thomson Electric Co., Plainville, Conn., to Turner Construction Co. Inc., Berlin, Conn.

365 tons, factory building, Syracuse, N. Y., General Electric Co., Schenectady, N. Y., to unnamed fabricator.

325 tons, shapes and bars, school, Westerford, Conn., to City Iron Works, Hartford, Conn.; and Scherer Steel Co., Hartford, to Wadhams & May Co., Hartford, general contractor.

250 tons, maternity building, Wesson Memorial hospital, Springfield, Mass., to Hampden Steel Co., Holyoke, Mass.; J. G. Hall & Sons Co., Springfield, general contractor; U. S. Steel Supply Co., Boston, reinforcing bars.

250 tons, shapes and bars, school, Swampscott, Mass., to Builders Iron Works, Somerville, Mass., and Truscon Steel Co., Boston; Rich Bros. Construction Co., Boston, general contractor.

180 tons, school, Framingham, Mass., to Grosisser & Shlager Iron Works, Boston; Frankini Construction Co., Medford, Mass., general contractor.

145 tons, miscellaneous construction, Florida East Coast railroad, to Ingalls Iron Works Inc., Birmingham.

140 tons, Douglass Junior High School, Washington, to Barber & Ross Co., that city; Cramer-Vollmerhausen Co., Washington, general contractor.

135 tons, warehouse, Star Market Co., Watertown, Mass., to Grosisser & Shlager Iron Works, Boston; William H. Porter Inc., general contractor; 80 tons bars to Northern Steel Inc., Medford, Mass.

125 tons, school, Manchester, Conn., 175 tons of shapes) to City Iron Works, Hartford; (50 tons of bars) to A. D. Donald Co., Springfield, Mass.; A. E. Stephens Co., Springfield, general contractor.

100 tons, bridge, Delaware, Lackawanna & Western Railroad, Jersey City, N. J., to American Bridge Co., Pittsburgh.

STRUCTURAL STEEL PENDING

7150 tons, power plant, Board of Transportation, East 74th St., Manhattan, New York; Bethlehem Steel Co., Bethlehem, Pa., low and only bidder.

7000 tons, superstructure, Charlestown connection, central artery, Boston; bids postponed to Apr. 17, state department of public works.

4515 tons, Congress street expressway, grade separation between Canal and DesPlaines streets, Chicago; Allied Structural Steel Companies, low bidder; Thomas McQueen, Forest Park, Ill., low on general contract.

4112 tons, sheet piling, Lincoln Park extension, Chicago; bids Apr. 20.

850 tons or more, buildings, Fort Richardson, Alaska; bids to U. S. Engineer, Seattle, Apr. 27.

600 tons, Public School No. 160, Bronx, New York; bids Apr. 23.

500 tons, plant, Sylvania Electric Products Co., Tonawanda, Pa.; bids closed Apr. 14.

250 tons, foundry addition, Chambersburg Engineering Co., Chambersburg, Pa.; bids Apr. 20.

250 tons, annealing shop, General Steel Castings Co., Eddystone, Pa.; pending.

135 tons, shapes and bars, state bridge, Dalton-Windsor, Mass.; Thomas R. Rawson, North Woburn, Mass., low.

120 tons, mill addition, E. J. Lavino & Co., Port Richmond, Philadelphia; bids asked.

110 tons, also 15 tons reinforcing, Chetco river bridge, Oregon; general award to Port Construction Co., Port Angeles, Wash., low $32,395, by Bureau of Public Roads, Portland, Oreg.

Unstated, field maintenance ordnance shop, Fort Richardson, Alaska; bids to U. S. Engineer, Seattle, Apr. 26.

Unstated, four radial gate hoists, etc., for Canyon Ferry dam; bids to Bureau of Reclamation, Denver, Apr. 24.

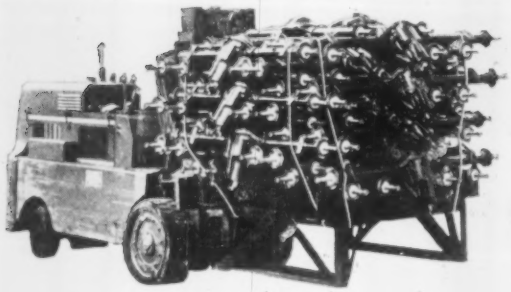
Unstated, radio chemistry building, Hanford laboratory center; bids to General Electric Co., Richland, Wash., May 3.

Unstated, shops, storage warehouses and other structures, Navy communication center, near Arlington, Wash.; Turnquist Construction Co., Seattle, low $310,741.

Unstated, repair shop; bids to Alaska Railroad, Anchorage, Apr. 30.

Unstated, steel decking and other items, White Salmon bridge, Hood River, Oregon, to Judd

Tie odd shapes firmly with



GERRARD STEEL STRAPPING

• As you can see (above), Gerrard Steel Strapping will readily conform to odd shapes such as auto axles palletized for freight shipment. Once tensioned and tied, Gerrard Strapping will hold a firm, tight grip until pallet or package reaches its destination. That's why it does such a good job holding carload lots of steel pipe and plate, and securing machinery to flat cars.

Why not get the full story about the Gerrard Method of Strapping from a Gerrard engineer? He will gladly tell you why Gerrard Steel Strapping does a better job at lower cost than any other metal reinforcement. His advice on your packaging problems is free. Send for a free copy of *Blue Book of Packaging.*

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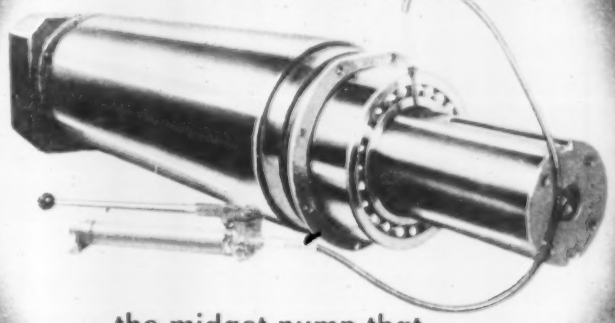
ROUND STEEL STRAPPING

UNITED STATES STEEL

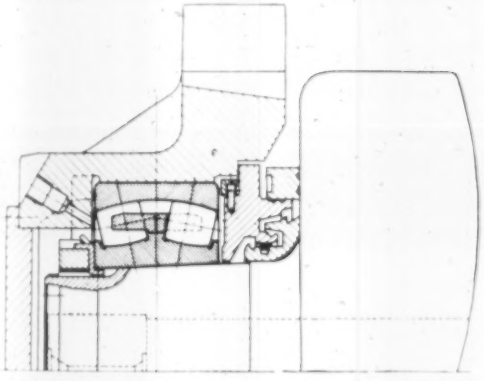
BEARING REMOVAL Easy as 123

SKF system for
HYDRAULIC BEARING REMOVAL



--the midget pump that
removes mighty bearings

STECKEL COLD MILL BACK-UP ROLL NECK. Bearing mounting designed for oil jet lubrication and complete oil drainage.



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The [redacted] Oil Injection Method is based on the fact that injection of oil under pressures of 5,000 to 25,000 psi almost entirely eliminates friction between the contact surfaces of a pressure joint during fitting and dismantling.

With defense production gathering momentum, you'll want to know more about this better way of mounting and dismounting bearings on continuous hot and cold strip mills. Why not get in touch with [redacted]'s engineers today?

8 REASONS WHY SKF IS PREFERRED BY ALL INDUSTRY

integrity
craftsmanship
metallurgy
tolerance control
surface finish
product uniformity
engineering service
field service

SKF
BALL AND ROLLER BEARINGS

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.
—manufacturers of **SKF** *and* HESS-BRIGHT *bearings.*

son-Pacific-Murphy Co., Emeryville, Cal.; E. E. Settergren, Portland, Oreg., low for installation, $141,916.

REINFORCING BARS . . .

REINFORCING BARS PLACED

4000 tons, Seattle's Ross dam powerhouse, to Northwest Steel Rolling Mills Inc., Seattle; Ross Power House Contractors, Seattle, general award.

2000 tons, water softening and filtration plant, Dayton, O., to Bethlehem Steel Co.; S. N. Nielsen Co., Chicago, contractor.

970 tons, Wacker Drive, Madison to Washington streets, Chicago, to Joseph T. Ryerson & Son Inc., Chicago; Herlihy Mid-Continent Co., Chicago, contractor.

500 tons, Wisconsin-Michigan Power Co., Iron Mountain, Mich., to Cook & Brown Lime Co., Oshkosh, Wis.

230 tons, Aeroproducts Division, General Motors Corp., Dayton, O., to United States Steel Supply Co., Chicago.

215 tons, intern resident dormitory, University of Wisconsin, Madison, Wis., to United States Steel Supply Co., Chicago.

200 tons, St. Charles Hospital, Toledo, O., to Hausman Steel Co. Inc., Toledo, O.

200 tons, Carney School, Ankeny, Iowa, to Laclede Steel Co., St. Louis; Garmer & Stiles Construction Co., Des Moines, contractor.

200 tons, new parts depot, Ford Motor Co., Broadview, Ill., to Truscon Steel Co., Youngstown; Austin Co., Chicago, contractor.

175 tons, Douglass Junior High School, Washington, to Bethlehem Steel Co.; Cramer-Vollmerhausen Co., that city, general contractor.

130 tons, grade school, S. Lamon Ave., Chicago, to Ceco Steel Products Corp., Cicero, Ill.; Coath & Goss Inc., Chicago, contractor.

125 tons, Hale elementary school, Chicago, to Ceco Steel Products Corp., Cicero, Ill.; Harvey A. Hanson, Chicago, contractor.

101 tons, school, Framingham, Mass., to Bethlehem Steel Co.; Frankini Construction Co., Medford, Mass., general contractor.

100 tons, Fort Lewis, Wash., telephone building, to English Steel Co., Tacoma, Wash.

REINFORCING BARS PENDING

20,000 tons, new Fairless Works, United States Steel Co., Morrisville, Pa.

1900 tons, storm relief sewers, section D, Dubuque, Iowa.

725 tons, bridge deck, Charlestown connection, central artery, Boston; bids Apr. 17, state department of public works.

600 tons, Gertrude Dunn Hicks Memorial Hospital, University of Chicago, Chicago; J. W. Snyder Co., Chicago, low on general contract.

525 tons, Town House, Chicago.

360 tons, State Library of Hygiene, University of Wisconsin, Madison, Wis.

350 tons, machinery foundations, aircraft engine plant, Ford Motor Co., Chicago.

340 tons, Minnetonka High School, Excelsior, Minn.

320 tons, Orewell dam, Fergus Falls, Minn.

300 tons, women's dormitory buildings, Des Moines, Iowa.

210 tons, postoffice garage, Milwaukee.

200 tons, Montana state highway bridges and 137-foot underpass, Sanders county; general award to Hansen & Parr, Spokane, Wash., $99,946; two bridges in Gallatin county, to McKinnon-Decker Co., Helena, low, $98,765.

185 tons, Akron City Hospital, Akron, O.

132 tons, Community High School, Crystal Lake, Ill.; Green & Gust Co., Chicago, low on general contract.

112 tons, engineering building, unit No. 2, University of Wisconsin, Madison, Wis.

100 tons, repairs, viaduct, at Commonwealth pier, Boston; bids in.

Unstated, apartment building, Sheridan road and Surf street, Chicago; bids in.

Unstated, hospital, Gibson City, Ill.; bids Apr. 24.

PLATES . . .

PLATES PLACED

800 tons, classified government project Washington state, reported to Gilmore Steel Co., San Francisco.

400 tons, tank replacements for Union Oil Co.'s Seattle terminal, to Consolidated Western Steel Corp., Seattle.

100 tons, special pulp mill tank equipment for plants at St. Helens, Oreg.; and Bellingham, Wash., to Consolidated Western Steel Corp., Seattle.

PLATES PENDING

10,500 tons, estimated, barges, No. 7 to Gunderson Bros. Engineering Corp., Portland, Oreg., at $1,475,269; National Steel & Shipbuilding Co., San Diego, Calif., at $908,713, and Flohr & Co., Seattle, Wash., two at $125,980.

120 tons, tank, National Lead Co., Sayreville, N. J.; pending.

100 tons, tanks for Army storage depot, Auburn, Wash.; Pittsburgh-Des Moines Steel Co., Seattle, low.

Unstated, fuel tanks, pumping facilities, Mountain Home air force base; bids in to U. S. Engineer, Seattle, Apr. 7.

PIPE . . .

STEEL PIPE PLACED

17,195 tons, natural gas line, Algonquin Gas Transmission Co., Indiana, through Ford, Bacon & Davis, New York, to Claymont Steel Corp., Claymont, Del.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Central of Georgia, 22 diesel locomotives to be built by American Locomotive Co., New York, and Electro Motive Division, General Motors Corp., LaGrange, Ill.

RAILROAD CARS PLACED

525 freight cars, Central of Georgia, to Pullman Standard Car Mfg. Co., Chicago, and American Car & Foundry Co., New York.

RAILS PLACED

Florida East Coast, 1000 tons, to Tennessee Coal, Iron & Railroad Co., Birmingham.

HERE'S WHY
VICTOR BLADES ARE ALWAYS *Uniform*

they're submerged in molten lead for heat treatment

There's never the slightest variation in Victor Blades—they're *always* perfectly uniform—all ways. That's because of Victor's exclusive heat treating process. Bundles of blades, enclosed in special cylinders, are plunged into 2 tons of molten lead. Heat penetration is absolutely uniform—no other method of heat treatment provides as accurate, rigid control of temperature.

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Use Steelrite Metal Marking Crayons. Mark cold, hot, damp or grimy metals, yet marks withstand pickling and do not affect enamel application. Ask your dealer for a free copy of Victor's fact-packed booklet, "Metal Cutting" for your tool box—the famous Victor Wall Chart for your shop. They'll make your metal cutting jobs easier.

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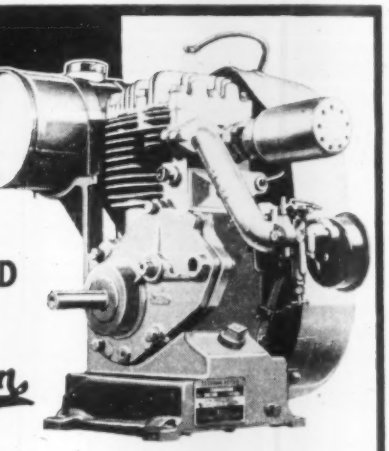
MIDDLETOWN, N. Y., U. S. A.

Makers of Hand and Power Hack Saw Blades, Frames and Band Saw Blades.



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LINCOLN, NEBRASKA

WRITE FOR DETAILS, SPECIFICATIONS, AND PRICES—DEPT. 4L

METALLURGICAL COKE

Price per net ton

Beehive Ovens

[illegible]sville, furnace	$14.50-15.00
[illegible]sville, foundry	17.00-18.00
[illegible] River, foundry	19.50
[illegible] county, foundry	15.95
[illegible] county, furnace	15.20

Oven Foundry Coke

[illegible]rney, N. J., ovens	$22.75
[illegible]tt, Mass., ovens	
[illegible] England, del.	*24.80
[illegible], ovens	23.00
[illegible]go, ovens	24.40
[illegible]icago, del.	22.50
[illegible]re Haute, ovens	23.75
[illegible]lwaukee, ovens	23.75
[illegible]anapolis, ovens	22.75
Chicago, del.	24.28
Cincinnati, del.	25.73
Detroit, del.	26.71
[illegible]nton, O., ovens	22.50
Cincinnati, del.	25.12
[illegible]nesville, O., ovens	24.00
Cleveland, del.	25.75
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.69
Philadelphia, ovens	22.70
Neville Island, Pa., ovens	23.00
Swedeland, Pa., ovens	22.00
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., ovens	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.75
Flint, del.	26.49
Pontiac, del.	25.42
Saginaw, del.	26.81

* Or within $4.15 freight zone from works.

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $75, Palmerton, Pa.; $75, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l. packed, $197; gross ton lots, packed, $212; less gross ton lots, packed, $220; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., Welland, Ont., or Ashtabula, O. Base price: $187, Johnstown, Pa.; $185, Sheridan, Pa.; $188, Etna, Pa.; $190, Chattanooga, Tenn. Shipment from Pacific Coast warehouses by one seller add $33 to above prices; f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244 f.o.b. Chicago. Add or subtract $2.30 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload packed 26.5c, ton lot 27.6c, less ton 28.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% min., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max.). Carload, lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 34c per lb of metal; packed, 34.75c; ton lot 36.25c; less ton lot 38.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: 250 lb to 1999 lb, 32c; 2000 to 39,999 lb, 30c; 40,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump bulk, 1.50% C grade, 18-20% Si 9.90c per lb of alloy, carload packed, 10.65c, ton lot 11.55c, less ton 12.55c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $3.25 per lb of contained W 2000 lb W to 10,000 lb W, $3.25; less than 2000 lb W, $3.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.) Contract or spot, 1000 lb or more, $4.15 per lb of contained W; less than 1000 lb W, $4.25.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.). Contract, ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract, $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 21.75c per lb of contained Cr, c.l. packed 22.65c, ton lot 23.80c, less ton 25.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%.) Contract, carload, lump, bulk, max. 0.03% C 33.60c per lb of contained Cr, 0.04% C 31.50c, 0.06% C 30.50c, 0.10% C 30.00c, 0.15% C 29.75c, 0.20% C 29.50c, 0.50% C 29.25c, 1% C 29.00c, 1.50% C 28.85c, 2% C 28.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. S M x D, bulk, 23.25c per lb of contained Cr, C.l., packed 24.15c, ton 25.50c, less ton 27.25c. Delivered Spot, add 0.25c.

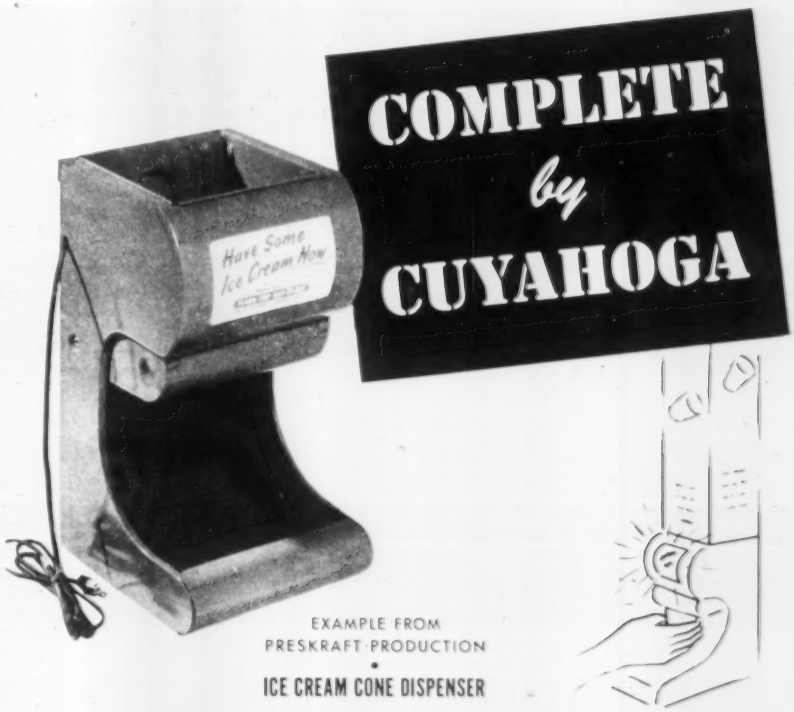
Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract carload, packed, S MxD, 16.35c per lb of alloy; ton lot 17.2c; less ton lot, 18.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 21.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 21.90c per pound of contained chromium plus 12.60c per pound of contained silicon, f.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 36-39%, Al 7-9%, C 0.05% max.) 21.75c per lb of contained silicon plus 12.4c per lb of contained silicon plus aluminum, 3" x down delivered.

Chromium Metal: (Min. 97% Cr and 1% Fe) Contract carload, 1" x D; packed, max. 0.50% C grade, $1.08 per lb of contained chromium ton lot $1.10, less ton $1.12. Delivered. Spot add 5c.

NOTE: Prices on silicon, vanadium, calcium zirconium, boron, briquetted and "other" ferroalloys appeared on page 163, Apr. 9, 1951 issue.



EXAMPLE FROM PRESKRAFT PRODUCTION

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ICE CREAM CONE DISPENSER

Thousands of these Ice Cream Cone Dispensers are in use at soda fountains all over the world. Developed, engineered and produced for one of our customers... *Complete by Cuyahoga,* this smartly styled dispenser with its flashing electric sign is typical of Cuyahoga Preskraft Service. Operating on contract, Preskraft does the entire job...a dependable source from the blueprints to the packaging and shipping. Consult with our representatives without obligation and learn how Cuyahoga facilities can save you money and increase your profits.

Preskraft Service includes...

- PROJECTION, SPOT AND ARC WELDING
- METAL FINISHING
- COMPLETE ASSEMBLY AND PACKAGING
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- SPRAY AND DIP PAINTING
- PUNCH PRESS AND PRESS BRAKE
- BONDERIZING
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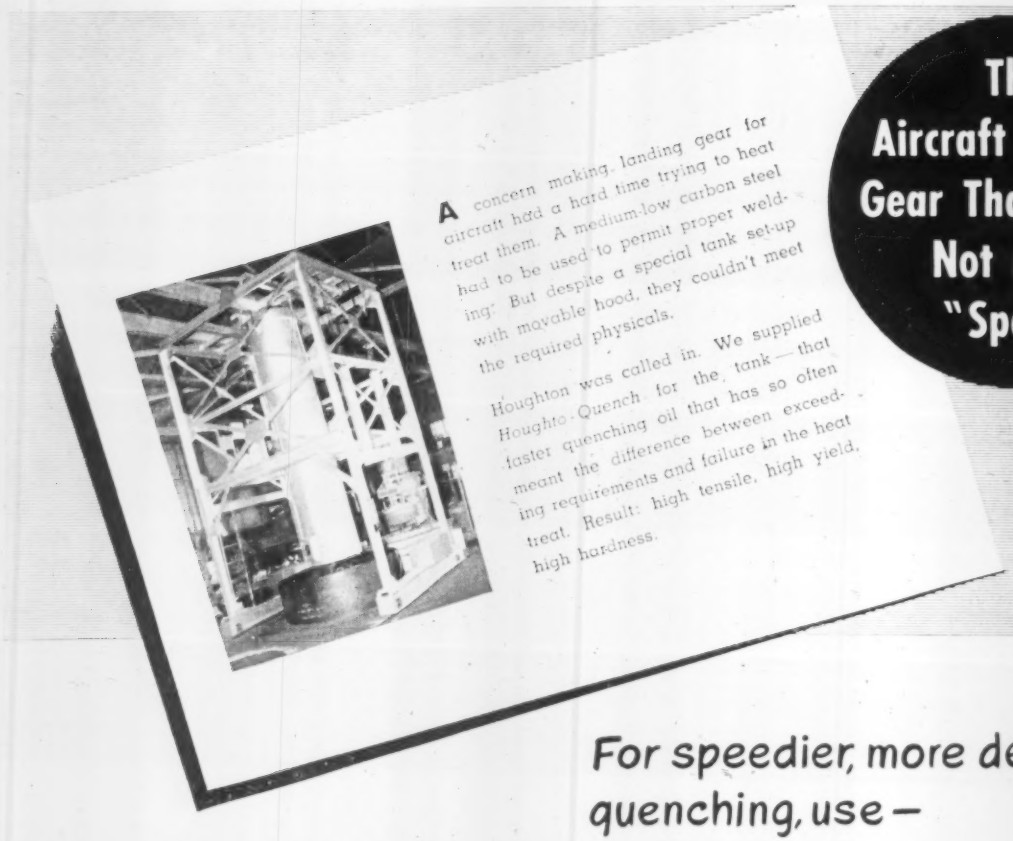
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CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Magnesium Foundry Opens

A new Magnesium Foundry Division was opened by Magline Inc., Pinconning, Mich. It will enable the company to greatly increase output of magnesium castings used in the company's standard line of products. The firm pioneered in development and manufacture of lightweight magnesium products for the industrial and materials handling fields.

$2 Million Plant For Coast

Flintkote Corp.'s Pioneer Division, New York, will build a $2 million plant in San Leandro, Calif., for the manufacture of folding paper box boards and liners for containers. The division acquired a 17½-acre site for the plant.

Shortages To Force Shutdown

Because of what Louis B. Neumiller, president, describes as a critical shortage of materials, Caterpillar Tractor Co., Peoria, Ill., will not be able to maintain maximum output at its San Leandro, Calif., plant during its usual two weeks vacation period, Aug. 6-19. He said no prime products will be assembled during that period, but the company does plan to manufacture parts.

Aircraft Firm Pushes Work

More than 13,000 employees of Consolidated Vultee Aircraft Corp., San Diego, Calif., went on a 10-hour, five-day work week. With backlog at more than $250 million, the company is working two shifts daily.

Monsanto To Build in Ohio

Monsanto Chemical Co., St. Louis, plans to convert facilities purchased from U. S. Pipe & Foundry Co. in Addyston, Cincinnati, to manufacture of Lustrex styrene and Resonex phenolic products. The 115-acre site borders the Ohio river, making possible water transportation of raw materials from Texas. U. S. Pipe & Foundry ceased operating the plant more than a year ago.

Plane Subcontracting Gains

Standardized Aircraft, Culver City, Calif., re-entered the aircraft subcontracting field by leasing the South Gate, Calif., plant of Service Equipment Co.

Bechtel Gets Salvage Job

General Petroleum Corp., Los Angeles, subsidiary of Socony-Vacuum Oil Co., will salvage 43 miles of eight inch pipe. It has awarded a contract to Bechtel Corp., San Francisco, to take up a 38-year old Mojave pipe line and re-install it at San Ardo in central California. The job will cost more than $2 million, but it will save about 2650 tons of scarce steel. The pipe will be cleaned and prepared for welding at a plant in San Miguel, Calif. The company anticipates a 98 per cent re-use of the old pipe.

Stamper Shifts Anchorage

Executive and sales offices of Anchor Mfg. Co. are now located at 419 Commonwealth Ave., Boston 15. The company is engaged in the sheet metal stamping business.

AMF Buys Junior Toy Corp.

Option to acquire all of the outstanding stock of Junior Toy Corp., Hammond, Ind., was exercised by American Machine & Foundry Co., New York. Junior Toy is one of the nation's leading manufacturers of velocipedes. American Machinery recently purchased Cleveland Welding Co., second largest manufacturer of bicycles in the United States. In addition to velocipedes, Junior Toy is engaged in the manufacture of shell components on an Army Ordnance contract.

New Firm To Import Tools

Perrish Steel Products Inc., Los Angeles, was formed to import machine tools and specialized steel products. Al Perrish, vice president, Winter Wolff & Co., same city, is manager.

Dearborn Chemical Moves

Dearborn Chemical Co., Chicago, will move its offices to Merchandise Mart Plaza, Chicago 54, on Apr. 16. The company manufactures rust preventitives and industrial boiler feedwater treatment. The new office also will house Electro-Chemical Engineering Corp., Dearborn subsidiary. The company's main factory and laboratory is located at 1029 W. 35th St., Chicago.

Wyckoff Appoints Agent

Wyckoff Steel Co., Pittsburgh, manufacturer of cold-finished steels, appointed C. J. White & Co., Houston, as its sales representative in the Texas Gulf Coast area and in Louisiana.

New Oxygen Plant To Open

An oxygen plant and warehouse will be opened about May 1 at 1223 McCook Ave., Dayton, O., by Burdett Oxygen Co., Cleveland. Production schedule calls for 7.5 million cubic feet of oxygen per month, plus a large quantity of nitrogen. Additional facilities for the production of acetylene and

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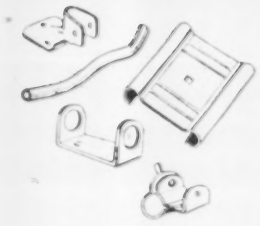

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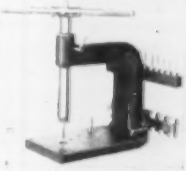

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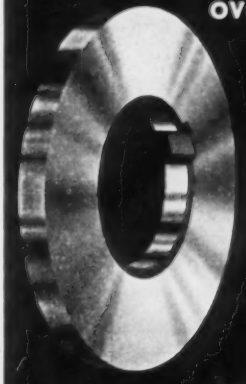

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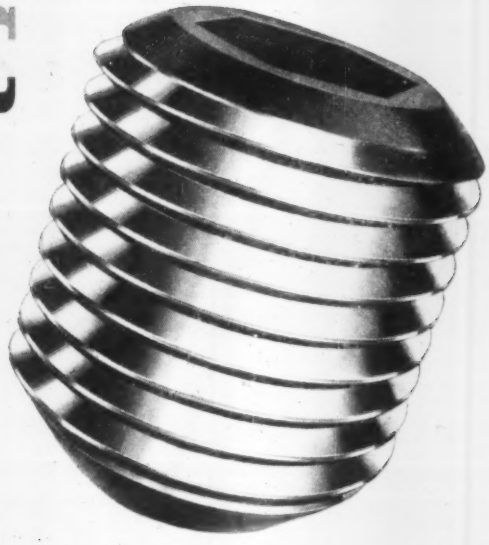

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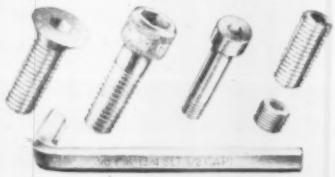

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propane will be added. Among other gases to be distributed from the Dayton plant will be argon, helium, carbon dioxide, propane, acetylene and medical oxygen. Plant manager is Carl Bird.

Plans $500,000 Pipe Plant

A $500,000 plant will be built in Seattle by U. S. Concrete Pipe Corp., Los Angeles. The firm was awarded a $1,908,641 contract to install the Bow Lake pipeline for the Seattle water department.

Cleco Changes Address

Cleco Division, Reed Roller Bit Co., Houston, moved its Philadelphia office to 5220 N. Fifth St. The Cleco and Dallett lines of pneumatic tools which the company produces include tools for construction, manufacturing, metal fabrication, foundries, industrial maintenance and stone carving.

Devicengineering Organized

William A. Diament, former vice president and sales manager, Fischer & Porter Co., Hatboro, Pa., organized a manufacturers' agency. The organization trades under the name of Devicengineering. It is representing manufacturers devoted largely to the production of custom electrical, hydraulic and instrument devices for industrial and aircraft applications.

Metal Fixtures Firm Formed

A new company to specialize in custom-built metal fixtures has been organized. Allied Metal Specialties Inc., 516 N. Charles St., Baltimore, has begun activity under the direction of R. E. Lee Mowbray, president. Facilities are available for the fabrication of plate, sheet, strip, wire, bars and shapes of any metal or alloy. The company will specialize in equipment designed for high temperature and corrosive applications. Products available from Allied Metal Specialties include: Plating racks, pickling baskets, tote boxes, metal pallets, crates, trays, racks, muffles, retorts and devices for handling or processing. Mr. Mowbray was associated formerly with Cambridge Wire Cloth Co., Cambridge, Mass., as manager of the fabricating division.

Burgess-Manning Expands

Architectural Products Division, Burgess-Manning Co., Libertyville, Ill., will be transfered on or about Apr. 15 to a building now being completed at 5970 Northwest Highway, Chicago. The new division, in charge of Dudley W. Day, vice president, will specialize in development, production and sales of the company's ceiling designed to heat rooms by radiation.

AEC To Build Laboratory

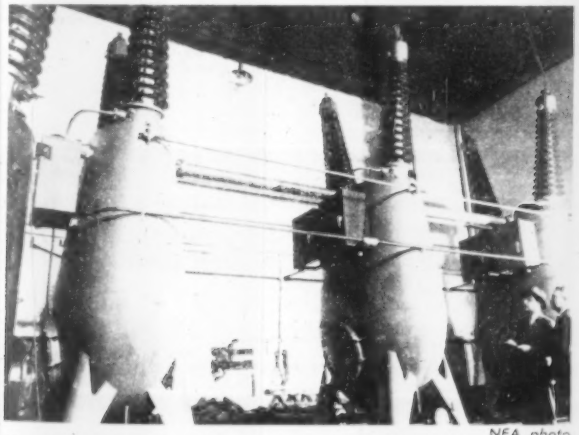
Santa Fe Operations Office, Atomic Energy Commission, will build a specialized research laboratory on a section of the National Bureau of Standards' grounds south of Boulder, Colo. Stearns-Rogers, Denver, is the architect-engineer. Beverly Spillman, of the AEC's office of engineering and construction, Los Alamos, N. Mex., is the project engineer and will co-ordinate the construction. When completed the facility will be operated by the National Bureau of Standards.

Midway Tool Appoints Agent

Midway Tool Co., Melvin, O., appointed Ed. T. Locke Co., Cincinnati, as sales representative for its auger bits in southern Ohio, Indiana, Michigan, Kentucky, Tennessee, certain sections of West Virginia and Virginia.

Building Contracts Awarded

A storage building, shop, compression house and other miscellaneous buildings will be constructed in Woodstock, Ill., by Ford, Bacon & Davis, New York.



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OIL SAVERS: New "watch case" design of these giant circuit breakers conforms to inner working parts to save oil and manpower needed to filter the oil. These guardians of high-voltage power lines are being tested by Westinghouse Electric Corp., Pittsburgh

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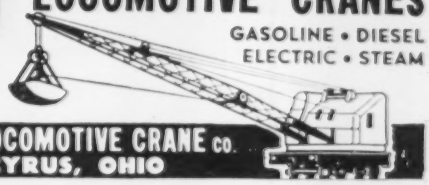

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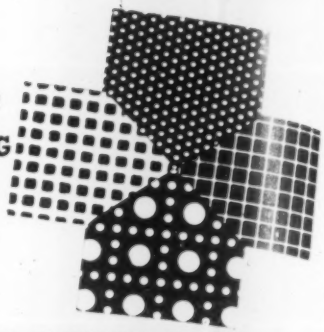

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Michigan-Wisconsin Pipe Line Chicago. Previously this firm awarded the contract for construction of the 250-mile 22-inch natural gas pipe line from Mill... Ill., to Detroit. The overall cost is estimated at $13.5 mil...

Celebrates 50th Anniversary

Hanna Engineering Works, Chicago, is celebrating its 50th anniversary this year. The company manufactures hydraulic and pneumatic cylinders, valves and riveters. The company was founded in 1901 by E. E. Hanna and purchased its present plant at 1765 Elston Ave. in 1917.

Rolling Mill Contract Placed

Dow Chemical Co., Midland, Mich., awarded a contract to United Engineering & Foundry Co., Pittsburgh, for work in connection with furnishing and designing of a continuous rolling mill for magnesium sheets at Madison, Ill. (STEEL, Feb. 26, p. 126). Austin Co., Cleveland, has the contract for rehabilitation of a former steel plant for the new enterprise and the installation of the equipment. Overall cost is estimated at $26 million.

Burrell Corp. Moves Offices

Offices and laboratories of Burrell Corp. were moved to new quarters at 2223 Fifth Ave., Pittsburgh. All needed facilities for efficient manufacture and distribution of scientific apparatus and laboratory chemicals have been brought together in one modern building.

Bredy Co. Shifts Quarters

Bertram Bredy Co. moved to new offices at 6713 N. Oliphant Ave., Chicago 31. The company represents: James Eagen & Sons, Eureka Electrical Products Co., Niagara Falls Smelting & Refining Division, Viking Copper Tube Co., Wallingford Steel Co., and Worcester Pressed Steel Co.

Ehret & Kinsey In New Office

Ehret & Kinsey, representative of Lubrication Products Co., Cleveland, will move its offices on May 1 to Board of Trade Bldg., 141 W. Jackson Blvd., Chicago 4. The new phone number will be Wabash 2-0449.

San Diego Gets Warehouse

Warren & Bailey Co., Los Angeles, industrial supply warehouse, opened a branch warehouse in San Diego with Charles Aperule as manager.

AEC Weldon Spring Project

California Research & Development Co., subsidiary of Standard Oil Co. of California, San Francisco, has been named architect-engineer-management contractor by the Atomic Energy Commission for its new developmental facility to be built on the site of the Weldon Spring Ordnance Works, Weldon Spring, Mo. It is reportedly a $100 million project.

Aircraft Duct Output Soars

Aircraft Duct Division, Arrowhead Rubber Co., a subsidiary of National Motor Bearing Co. Inc., Downey, Calif., is being transferred to larger quarters at 2350 Curry Ave., Long Beach, Calif.

Globe Steel Appoints Agent

Globe Steel Tubes Co., Milwaukee, appointed A. B. Murray Co. Inc., Elizabeth, N. J., as distributor of its complete line of seamless steel welding fittings. Stocks of the fittings will be carried at Murray's McKeesport, Pa., as well as its Elizabeth warehouse.

Plans $10 Million Plant

Standard Oil Co. of California is constructing a $10 million benzene plant at its El Segundo, Calif., refinery to expand synthetic rubber output. The plant will turn out 13 million gallons of benzene annually and 3200 barrels of toluene daily. Completion before 1952 is scheduled.

Sperry Expands in Canada

Outstanding shares and assets of Ontario Hughes-Owens Co., Ottawa, Canada, were sold to Sperry Corp., New York, and its Canadian subsidiary, Sperry Gyroscope Co. of Canada, Montreal. Hughes-Owens is a manufacturer of marine and aircraft instruments. The Sperry interests plan to expand operations to meet the increasing demand for military and commercial products.

Harvester Firm Expands

Construction of a laboratory building for International Harvester Co.'s Melrose Park, Ill., plant is estimated to cost $1,324,809. Ragnar Benson Inc., Chicago, is the contractor.

Swedlow Building Canopies

Canopies for aircraft will soon be produced in Youngstown by Swedlow Plastics Co. The company some time ago took over the Youngstown plant of Great Lakes Carbon Co.

Incorporation Papers Filed

Charters of incorporation have been filed with the secretary of state's office, Dover, Del., by the following: Eliasal Corp., machinery, with U. S. Corporation Co., Dover, serving as principal office; Associates Industries Inc., steel and metal, and Cold Forging Processes Inc., machinery, with Corporation Service Co., Wilmington, Del., serving as principal office; Pressed Steel Car Corp., railroad cars, Atomic Electro-Generator Corp., electro-generators, and United Aluminum Co. Inc., aluminum, with Corporation Trust Co., Wilmington, serving as principal office; Dean Strickler & Associates Inc., machinery, with Capital Trust Co., Dover, serving as principal office.

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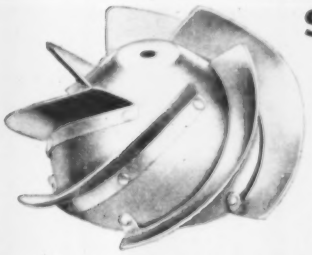

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1—#1½ 56 Ton Cap. BLISS PRESS 4½" Str. Dbl. Rl. Fd. Scr. Ctr. 1942
1—#304 34 Ton Cap. BLISS PRESS 8" Str. 1942
1—#74½ 90 Ton Cap. BLISS PRESS 1½" Str.
1—50 Ton H&W POWER PRESS 2" Str. Grd. FW Dbl. Rl. Fd. Scr. Ctr.
2—25 Ton H&W POWER PRESSES 1¼" & 1½" Str. FW Dbl. Rl. Fd. Scr. Ctr.
1—45 Ton RELIANCE INCL. PRESS Sgl. Crank
2—125 Ton WTBY-FARREL COIN. PRESSES 1½" Stroke
1—15 Ton AMERICAN HYDR. STR. PRESS 20" Str. Late
1—10 Ton Hydr. OILGEAR Str. Press. Late
1—KENT OWENS MODEL 1M HAND MILLER. Late
1—CINCINNATI 08 VERT. MILLER. Late
2—HALL PLANETARY THREAD MILLERS
1—Savage NIBBLER ¼" Cap. Late

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